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THE ORGANISATION OF
ELECTRICITY SUPPLY
IN GREAT BRITAIN

It is no more the duty of a publisher to disclaim responsibility for the views of an author than to affirm acceptance of them; but, of course, he takes the responsibility for presenting those views to the public.

The publishers of this important book by Dr. Ballin, having been long and actively associated with electrical development, desire to say frankly that they are not always in sympathy with the author's interpretation of events on the evidence presented, nor always in agreement with his judgment on motives when he enters the political field. Nevertheless, they recognise in Dr. Ballin's work those qualities of sincerity and impartiality which, coupled with the fruits of his painstaking and invaluable research, merit the closest attention of all concerned with the future of the Electricity Supply Industry.

THE
ORGANISATION OF
ELECTRICITY SUPPLY
IN GREAT BRITAIN

By

H. H. BALLIN, B.Sc. (Econ.), Ph.D., Assoc.I.E.E.

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*This book is produced in complete conformity with the
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To
MOLLIE

Made and Printed in Great Britain by Electrical Press
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PREFACE

THE beginning of this book goes back to the dark days of September, 1938, when the author decided to write a thesis on the present organisation of the electric supply industry which he hoped to complete before the outbreak of war expected within twelve months. The result of a year's work, however, was the realisation that the present and future of electricity supply cannot be properly understood without a knowledge of its historical growth and that in the absence of any existing book on the subject a lengthy research into the available sources would be necessary. This task was not made any easier by the conditions of aerial bombardment of London and the closing and evacuation of many public libraries. At one time the only library at which Hansard could be inspected was at Brixton !

If the author should have overlooked any publication or fact of material consequence, he asks the reader's pardon.

The thesis was completed in 1942 and a degree of Doctor of Philosophy was conferred upon the author by the London University in November, 1942. Afterwards the work was expanded and an entirely new chapter on the question of reorganisation of electricity distribution was added.

The history of electricity supply may be of interest also to circles not directly concerned with the industry, as it illustrates the success or failure of a variety of methods of Government control over industry.

The author wishes to express his gratitude to Messrs. J. S. Conlan, F. C. Garrett, Leslie Gordon, T. G. Haldane, the late Lord Hirst of Witton, Mr. E. H. Jesty, and to his tutors at the London University—Professor Lionel Robbins, Mr. R. H. Coase and Mr. G. L. Schwartz—for many helpful suggestions and constructive criticisms.

A special word of thanks also to Messrs. Cortesey and Grant, of the I.E.E. Library, and Messrs. Brown and Ward, of the London and Home Counties J.E.A., for their untiring help.

Two articles entitled "Public Boards for Electricity Distribution" substantially based on the last chapter of this book were published in the March and April, 1945, issues of *Electrical Industries*.

H. H. BALLIN.

June, 1945.

LIST OF MAIN ABBREVIATIONS

A.M.C.	Association of Municipal Corporations.
B.O.T.	Board of Trade.
B.P.P.	British Parliamentary Papers.
El.	Electrician.
El. Com.	Electricity Commissioners.
El. Rev.	Electrical Review.
El. T.	Electrical Times.
H.C.	House of Commons.
H.L.	House of Lords.
I.A.E.P.C.	Incorporated Association of Electric Power Companies.
I.M.E.A.	Incorporated Municipal Electrical Association.
I.E.E.	Institution of Electrical Engineers.
J.E.A.	Joint Electricity Authority.
J.I.E.E.	Journal of the Institution of Electrical Engineers.
Mun. J.	Municipal Journal
Parl. Deb.	Parliamentary Debates.
Proc.	Proceedings.
J.R.S.A.	Journal, Royal Society of Arts.

CONTENTS

	PAGE
<i>Preface</i>	V
<i>List of Main Abbreviations</i>	VI
<i>Introduction</i>	XI

CHAPTER I. SMALL BEGINNINGS

I. THE BACKGROUND	1
II. BEGINNING OF ELECTRICAL INDUSTRY	4
III. THE ELECTRIC LIGHTING ACT, 1882	6
IV. THE CONCESSIONS OF 1888	12
V. THE TREND OF DEVELOPMENT IN LONDON	15
VI. CONCLUSIONS	20

CHAPTER II. THE MUNICIPAL TRADING CONTRO- VERSY

I. THE CHALLENGE OF MUNICIPAL SOCIALISM	22
II. THE ECONOMIC RECORD	25
III. SPECIAL CHARACTER OF PUBLIC SUPPLY	27
IV. DELAY AND OBSTRUCTION	31
V. CONCLUSIONS	33

CHAPTER III. LARGE-SCALE SUPPLY AND UNCO- ORDINATED EXPANSION

I. CONDITIONS OF SUCCESSFUL SUPPLY	34
II. THE POLITICAL DIFFICULTIES OF ADAPTATION	37
III. PROPOSALS FOR CONCENTRATION	40
(1) Combination of Companies	40
(2) Power Companies	42
(a) The Power Company Schemes	42
(b) Bulk Supply	44
(c) Power Supply	45
(d) Municipal Opposition	48
(e) The Grant of Permanent Concessions	50
(f) Price Control by Sliding Scale	53
(g) The Failure of the Power Companies	54
(3) Municipal Schemes	57
(a) Extension from Urban Centres	58
(b) Voluntary Joint Action of Local Bodies	60
(c) New Public Authorities	62
(4) Mixed Undertakings	63
IV. THE ACT OF 1909	65
V. CONCLUSIONS	68

CHAPTER IV. LONDON'S STRUGGLE FOR ELECTRICAL UNIFICATION, 1900-15

I. THE NEED FOR REFORM	69
(1) Concentration of Generating Plant	72
II. REORGANISATION PROPOSALS, 1902-08	75
(1) Power Company Schemes	75
(a) The Administrative County Company	75
(b) Other Power Company Schemes	78
(2) The L.C.C. Schemes	79
(3) Schemes of Existing Undertakings—The London Electricity Supply Acts, 1908-1910	84
III. THE FAILURE OF PERMISSIVE LEGISLATION	87
(1) The L.C.C. Scheme, 1914	89
(2) The Novel Solution : a Mixed Undertaking	91
(3) The London Electric Supply (No. 2) Bill, 1915	93

CHAPTER V. ELECTRICITY IN THE FIRST WORLD WAR

I. ELECTRICITY UNDER WAR CONDITIONS	95
II. ELECTRICITY A FACTOR IN NATIONAL POST-WAR RECONSTRUCTION	98
(1) National Schemes	100
(2) Voluntary Local Arrangements	101
III. REORGANISATION PROPOSALS	102
(1) Interconnection of Stations	102
(2) Central Controlling Body	104
(3) Regional Organisation	106
(a) District Boards	108
(b) Nationalisation Proposals	110
IV. CONCLUSIONS	111

CHAPTER VI. ATTEMPTS AT REGIONAL REORGANISATION

I. THE POLITICAL AND ECONOMIC BACKGROUND	113
II. THE ELECTRICITY SUPPLY BILL, 1919	115
(1) The Electricity Commissioners	116
(2) Technical Reasons for Regional Generating Bodies	118
(3) The District Electricity Boards	119
(a) Functions of District Boards	121
(b) Purchase Terms	122
(c) Finance	126
III. THE REJECTION OF COMPULSORY POWERS	130
(1) The Introduction of the J.E.A.	130
(2) The Disappearance of National Reconstruction	132
IV. THE VICTORY OF THE STATUS QUO	134
(1) The Ordeal in the House of Lords	134
(2) The Electricity Act of 1919	136
(a) The Reception of the Act	137
(b) The Failure of the Act	138

(3) Alternative Solutions	141
(a) Power Companies	141
(b) Advisory Boards	144
(4) Financial Power for J.E.A.s	146
(5) The 1922 Act	149
(6) Distribution	150
V. CONCLUSIONS	152

CHAPTER VII. THE FORMATION OF THE LONDON AND HOME COUNTIES J.E.A.

I. INTRODUCTION	154
II. A JOINT AUTHORITY FOR LONDON	157
(1) Orthodox J.E.A. Schemes	157
(a) Area of the Electricity District	158
(b) The Technical Scheme	159
(c) Constitution	162
(d) Functions of the J.E.A. under the 1921 Schemes	163
(e) Recommendations of the Electricity Commissioners	166
(2) The Progressive Weakening of Central Control	167
(a) Independent Schemes for Municipal and Company Undertakings	167
(b) The First Draft Order	169
(3) The Final Emasculation of the J.E.A.	170
(a) L.C.C. Agreement and New Draft Order, 1924	170
(b) Opposition by the Local Authorities	171
(c) The 1925 Settlement	172
(4) The Prospect for the Future	182
III. CONCLUSIONS	183

CHAPTER VIII. NATIONAL REORGANISATION OF GENERATION AND TRANSMISSION

I. THE NEED FOR A NATIONAL SCHEME	184
II. CENTRALISED CONTROL OF GENERATION	187
(1) Plans and Politics	187
(2) The New Solution : A National Transmission Board	192
(3) The Passage of the Bill	195
III. THE CENTRAL ELECTRICITY BOARD	199
(1) Constitution	199
(2) Relation to the Electricity Commissioners	202
(3) Initiation of Schemes	204
(4) Working of the Schemes	206
(a) The C.E.B., a Wholesaler of Electricity	207
(b) Bulk Supply Charges of the C.E.B.	208
(c) The Position of Non-selected Stations	211
(d) Position of Power Companies and J.E.A.s	214

(5) Control over the C.E.B.	217
(a) Control by the Electricity Commissioners	217
(b) Arbitration	219
(c) Parliamentary Control	220
IV. THE FUTURE OF THE C.E.B.	221

CHAPTER IX. THE PROBLEM OF ELECTRICITY DISTRIBUTION

I. THE PRESENT SITUATION	224
(1) Intensive Development	224
(2) Extensive Development	227
(3) Rural Electrification	231
II. REASONS FOR UNSATISFACTORY PROGRESS	238
(1) Lack of Effort	239
(2) Unsuitable Size of Undertakings	240
(3) Multiplicity of Systems and Voltages	242
(4) Variety of Methods of Charge	243
III. CONTROL OF PRICES	247

CHAPTER X. CONSIDERATIONS FOR THE REORGANISATION OF THE INDUSTRY

I. SUMMARY OF PROPOSALS	251
II. REMEDIES FOR THE SHORTCOMINGS OF THE INDUSTRY	255
(1) Encouragement of Enterprise	256
(2) Standardisation of Technical and Financial Methods	258
(a) Standardisation of Systems and Voltages	258
(b) Uniform Methods of Charge	259
(3) Gaining the Advantages of Large Size	261
(a) External Assistance to Independent Undertakings.	261
(b) Amalgamation	263
(4) Prevention of Further Disintegration	264
III. CONSIDERATIONS OF NATIONAL PLANNING POLICY	266
(1) Planned Industrial and Agricultural Development	267
(2) Planning for Full Employment	274
(3) Equality of Tariffs	278
(4) National Fuel Policy	282
IV. POLITICAL PROBLEMS OF REORGANISATION	287
(1) Desire for Independence	288
(2) Absorption by Larger Undertakings	292
(3) Formation of New Authorities	296
(a) Representative Regional Boards	298
(b) Public Service Boards	303
V. CONCLUSIONS	310

<i>Bibliography</i>	315
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<i>Index</i>	319
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INTRODUCTION

“Men legislate not in accordance with their opinion as to what is good law, but in accordance with their interest, and this is emphatically true of classes as contrasted with individuals and therefore of a country like England, where classes exert a far more potent control over the making of laws than can any single person.”

—A. V. DICEY, LAW AND OPINION DURING THE 19TH CENTURY.

The 20th century has been called the age of collectivism in contrast to the 19th century, which was considered as the Liberal era. Generalisations are often dangerous and misleading, for there are many conflicting tendencies in every period. The victory of individualism and *laissez faire* in Great Britain was only complete for a few decades around the middle of the last century and was accomplished only for a short time, if at all, in the countries of the European Continent. There cannot be any doubt that, especially since the first World War, there has been a strong common trend towards a new and closer relation between the individual and the community.

Economic Liberalism was the expression of individualistic self-confidence, of the faith that progress was best served by the profit-seeking activities of small individual entrepreneurs. If every trade and industry was opened to any newcomer, high profits in any one branch would attract competition which would level down prices and profits and thus protect the consumer. Free competition was an essential condition for the functioning of the individualistic economy, whereas the State remained in the background and had only the duty of ensuring law and order.

Towards the end of the 19th century conditions changed, technical progress favoured the growth of large-scale industrial undertakings with complicated and expensive plant, necessitating the investment of very large sums of money. Finance and manage-

ment became concentrated in large joint stock companies, the workers organised themselves in powerful trade unions. Not all industries witnessed this development towards large units (perhaps numerically they were a small minority), but this minority consisted of the basic industries on whom the economic life of the community depended. Their success or failure reacted on the wellbeing of a very large number of people and could, therefore, not be a matter of indifference to the community. All these factors strengthened the power of large-scale industry, which established a quasi-monopolistic position because of the increasing risks deterring potential competitors or through the active protection, especially against foreign competition, granted by the State. The automatic adjustments and remedies appropriate for a small-scale competitive society proved powerless under conditions of inelastic monopolistic competition. Widespread depression, economic nationalism, the gangster regimes thrown up during the inter-war years, all were symptoms of a crisis which was partly the result of the changed structure of industry, and partly of the new attitude of the State in interfering to an increasing extent in economic life. At first the State sought protection for one class or industry at the expense of other classes or countries, which increased instead of reducing the dislocation of the economic organism. The result was, therefore, piece-meal interference in the shape of subsidies, import restrictions and other measures which strangled international trade without curing depression at home.

There is today little chance of, and even less faith in, a return to the conditions of the 19th-century Liberalism; on the contrary, the conviction is voiced that salvation lies in the comprehensive planning and control of the economic life by the State. Great dangers as well as great possibilities lie in the concentration of power in one authority; unless democratically controlled and inspired, an all-powerful bureaucratic machine may completely engulf the individual and seriously impede human progress.

If this interpretation of the contemporary trend is correct, a re-orientation of economic science appears to be called for, or rather a re-consideration of some of its underlying assumptions. The concept of the economic man was a useful and workable abstraction in the Liberal era, but has become increasingly unrealistic through the emergence of factors which had hitherto been taken for granted as constants and neglected. The State formed simply

the legal and constitutional background, which need not be considered, apart from specific cases of interference, such as in taxation and Balance of Trade policy. The very purpose of Government planning and control is to influence economic development in the interest of political or social ends and to supersede the "blind force" of the market. State policy must, therefore, be brought into the purview of any investigation into the conditions of industry.

The term "State" itself is a conventional abstraction and is visualised as an entity supported by and yet independent from the people. We have to search behind this façade to find the real forces which determine the life of the community. The seemingly simple relationship of State and industry is then revealed as a bewildering tangle of conflicting pressures which have to be considered and understood by the Economist if he wants to explain the course of economic events.

There is a danger of being overwhelmed by the variety of influences and tendencies, and certain abstractions and simplifications are necessary if the study is to reach useful conclusions. It may be convenient to distinguish between two main classes of influences, both affecting State policy with regard to any particular problem :—

1. The pressure of those groups which have an immediate stake in any particular arrangement or organisation, in its maintenance or removal, groups which may conveniently be called "vested interests," a term used throughout this discussion without implying any moral condemnation. The attitude of vested interests in any issue is fundamentally simple, founded on their determination to hold and maintain any power and prestige they possess, and their ambition to increase them. Under similar circumstances their reaction may be expected to be similar, though possibly outwardly modified to suit the trend of public opinion at the time.

2. The other group of influences consists of the body of "beliefs, convictions, sentiments, accepted principles or firmly-rooted prejudices, which, taken together, make up the public opinion of a particular era,"¹ not directly concerned with the issue at hand, but taking a stand because of the general principles involved, because of a feeling of solidarity with one or the other party of vested interests, or for purely political reasons. A careful investigation

¹ A. V. Dicey, *Law and Opinion during the 19th Century*, 1st ed., 1905, p. 19.

into the attitude of the public towards any issue at any given time would involve a great deal of research in fields outside the scope of economics. For our purposes, sketches of the main trends of thought are sufficient to form a background against which the battles of the major interested parties are fought.

By simplifying in this way the bewildering mosaic of influences we are enabled to study the relationship of any branch of industry with the State and to investigate the possibilities and limitations of state action in economic life. We may even attempt to draw conclusions from the experience of the past and to apply them to the problems of the future.

In Great Britain, even after 1918, industry as a whole retained great independence from the State, although the range of public control was continually widening. Only the Public Utilities, industries providing important public services under conditions which exclude the automatic control of competition, have for a long time been supervised by State organs and, therefore, offer a fruitful subject for investigation.

This study is concerned with the development of organisation and control in the electricity supply industry, and questions of efficiency and absolute growth need only be considered in so far as they affect the problem of organisation. Contemporary opinions on technical and economic questions will be quoted to a large extent to enable a problem to be seen in the way it appeared at the time.

The history of the relationship between the State and the electricity supply industry gives an illustration of the inter-weaving and inter-dependence of technical, economic and political factors. The story will show the many kinds and degrees of State interference which have been attempted, and the conclusions which may be drawn as to the effectiveness of various methods may be useful even outside the industry discussed. It will be attempted to establish the causes of the failure of so many efforts to adjust the structure of the industry to the technical necessities, and to understand to what extent such failure was inherent in the solutions sought. In this way we may grasp the foundations on which the success of future reform should be based.

Even with this restriction to one industry, the field to be covered is wide. To discuss the development of electricity supply in general without reference to actual examples lacks conviction, but a

thorough investigation of the experience in the whole of Great Britain, fascinating as it would be, cannot be attempted, if the present volume is to be confined within a reasonable compass.

Greater London has, therefore, been chosen as a fairly representative example, which reproduces most of the problems of the country on a smaller scale, but which raised them in an acute form many years before they became urgent in the remainder of the country. The experience of London could have served as a warning, and if any attempt had been made to profit from the lesson of its failures many disappointments might have been avoided.

NOTE: The Government Department in charge of the control of electricity was the Board of Trade until 1919, when the newly-founded Ministry of Transport took over this function. In 1941 the supervision was returned to the Board of Trade, but in June, 1942, the new Ministry of Fuel and Power became the responsible department.

Any reference to the Ministry of Transport should, therefore, be read in the knowledge that the identity of the controlling department has undergone and may undergo further changes.

CHAPTER I

SMALL BEGINNINGS

I. THE BACKGROUND

THE beginning of the electricity supply industry coincided with a strong new manifestation of the spirit of collectivism, a spirit which had survived even during the years of unmodified *laissez faire*, but which had stirred afresh after about 1865 and had become a dominant influence in 1880.¹

Dicey points out that the ultimate end of English legislation during the era of individualism was to promote legislation in accordance with the principle of utility, the immediate object being the extension of individual liberty to ensure the greatest happiness of the greatest number. When it appeared that this policy was at every turn thwarted by the oppression or inertness of classes biased by some sinister interest, sincere believers in *laissez faire* found that for the attainment of their ends the improvement and strengthening of Government machinery was an absolute necessity.²

This belief in the task of the State to act for the attainment of utilitarian ends was widely held in the working classes, which had little confidence in their individual strength, and regarded the State as "the biggest and most trustworthy trades union . . . their pressure became increasingly felt as the suffrage was gradually lowered."

Joseph Chamberlain's view "that the State is justified in passing any law or even doing any single act which in its ultimate conse-

¹ For detailed description, see A. V. Dicey, *loc. cit.* pp., 64, 66 and *passim*; J. H. Clapham, *Economic History of Modern Britain*, vols. 2 and 3 *passim*; W. A. Robson, *A Century of Municipal Progress*, 1936, *passim*.

² *Ibid.*, p. 306.

³ *Economist* 32, 1894, p. 416.

quence adds to the sum of human happiness, was shared by Randolph Churchill, the Tory Democrat, Robert Blatchford, the Socialist, and a great number of plain men ”⁴

The new outlook in Britain found its expression in many ways, the nationalisation of telegraphs in 1870, social legislation such as the Public Health Act, 1875, the Factory Act, 1878, the extension of organised trade unions in the Combination Act, 1875, etc. There is a difference of experience between Great Britain, where strong trading and financial interests continued to press for free trade and the small-scale individualist structure of industry delayed or completely prevented the growth of monopolistic bodies, and the new nations like the United States of America and Germany, in which new large-scale industries quickly organised themselves into powerful groups, often with the active assistance of the State.

It is natural that in such times industries providing essential public services under conditions approaching monopoly, the so-called public utilities, should have been subjected to a careful scrutiny. The most important of these industries were gas, water and tramways, and many such undertakings were in the hands of companies operating under statutory authority.

Originally the principle of competition had been relied upon to safeguard the consumer against exploitation, but it proved unsatisfactory. Where real competition existed, as between a number of gas companies in London, “a great deal of capital was wasted, streets were turned up by competing companies and it became such a nuisance that the companies eventually districted London amongst themselves, making a practical monopoly which was confirmed by the Metropolitan Gas Company Act of 1860.”⁵

The defects of competition, or rather the difficulty or impossibility of maintaining it, became apparent, and price fixing agreements, the carving up of territories into spheres of influence and other devices were employed to defeat the policy of competition.⁶ The Gas Works Clauses Act of 1847 introduced a new kind of statutory regulation, the insertion of maximum prices for gas in private bills. Unfortunately maximum prices were no guarantee of good and reliable service and could not improve the poor quality of gas, which caused a great deal of dissatisfaction ; a leading article of

⁴ J. H. Clapham, *loc. cit.*, Vol. 3, 1938, p. 397.

⁵ T. H. Farrer, *Ev. to Sel. Com. on El. Lighting*, B.P.P., 1878-9, XI, q. 1642.

⁶ W. A. Robson, *loc. cit.*, p. 305.

The Times referred to the long-standing grievance that London's gas was both bad and dear.⁷

To encourage greater efficiency the Board of Trade suggested in 1868 another plan to "harmonise interests of consumers and gas companies by fixing a certain dividend on a certain price and then allowing dividends to rise as prices diminished."⁸ This idea of a sliding scale (which became one of the few reasonably effective means of price control of public utilities) was only adopted later in the Commercial Gas Company Act, 1875.

Already in the 40's the belief in competition was severely shaken and municipal ownership recommended and adopted in its place. In 1876 the Corporation of Stockton and Middlesbrough was authorised by private Act to purchase by compulsion the works of the local water company as its service had been unsatisfactory, a precedent to be followed by many others, "as there was a strong feeling in the country that the supply of gas and water should be in the hands, not of private companies, but of public Corporations."⁹

Dissatisfaction with the services rendered by companies strongly reinforced the case for public management of utilities, which found increasing support. Most public utility services were essentially local and urban in character and the local authority appeared obviously as the most suitable organ for the running of these industries.

Municipal trading is collectivism *par excellence*. Its aim is "to use the wealth of the ratepayer in a way which may give to all the inhabitants of a particular locality benefits which they cannot obtain for themselves."¹⁰ After the Municipal Reform Acts of 1875, 1882 and 1888 had swept away many restrictions¹¹ and created strong democratically controlled municipal bodies, local authorities became increasingly capable and anxious to undertake new responsibilities. Private enterprise, however, had already gained control over gas and water, and had obtained perpetual concessions in the majority of towns. The Public Health Act of 1875 authorised the transfer of water works to local authorities, but generally the complicated and costly procedure of Special Act Legislation was

⁷ *The Times*, 7-10-1874.

⁸ T. H. Farrer, *loc. cit.*, q. 1644.

⁹ J. H. Balfour Browne, *On the Compulsory Purchase of the Undertakings of Companies by Corporations*, 1876, p. 5.

¹⁰ A. V. Dicey, *loc. cit.*, p. 287.

¹¹ D. C. Somerwell, *English Thought in the 19th Century*, p. 200.

adopted. In spite of this, the number of municipal works grew at an increasing rate and by 1899 173 out of 265 municipalities managed their own water supply.¹²

The position of the gas industry was different. Of the larger towns only Manchester had originally installed its own gas works, other corporations had to buy up company or private undertakings at high prices if they wanted to manage the gas supply themselves. Until 1881, when the advent of electricity made a gas undertaking appear less attractive, the purchases had been increasing in number, but in that year there were still 336 company against 136 municipal undertakings.¹³ As late as 1933, out of 656 authorised gas undertakings in England and Wales 409 were in company hands.¹⁴

In order to safeguard the public and give it an opportunity of public management of traction undertakings at an early date, the Tramways Act of 1870 limited concessions to 21 years (S. 43) and made their grant entirely dependent upon the consent of the local authority through whose area the tramway was intended to run. In spite of these strong restrictions, the industry was stated to be flourishing, and a House of Commons Committee in 1879 recommended that tramways should be constructed and maintained but not worked by local authorities, that the consent of local authorities should be necessary for private undertakings and that local authorities should have the right to drive their own bargains with private promoters.¹⁵

These recommendations, as well as the original Act, were considered to form "an admirable precedent for the case of electric light,"¹⁶ and it is not surprising that Mr. Joseph Chamberlain, the young and ambitious President of the Board of Trade, should have framed certain clauses of his Electric Lighting Bill of 1882 after the example of the Tramways Act of 1870.

II. BEGINNING OF THE ELECTRICAL INDUSTRY

Although scientists had been familiar with certain electrical phenomena and principles for a long time, it was the invention of the carbon lamp by Jablockhoff in April, 1877, which attracted

¹² J. H. Clapham, *loc. cit.*, Vol. 3, p. 441.

¹³ T. H. Farrer, *The State in Relation to Trade*, 1883, p. 86.

¹⁴ W. A. Robson, *loc. cit.*, p. 309.

¹⁵ T. H. Farrer, *Ev. to Sel. Com. on El. Lighting*, *loc. cit.*, q. 1672, 1685.

¹⁶ *Ibid.*

public attention to the possibilities of electricity as an illuminant.¹⁷ In 1878 the new light source had found application in the lighting of the Embankment in London and in some large commercial premises, but as the lamp was of high power, its scope appeared to be limited. The situation was fundamentally altered when Swan succeeded in "subdividing light" by using the white heat of a continuous carbon conductor as the light source. Swan had a patent on the first glow lamp granted in January, 1880, a short time after Edison had obtained a patent on a similar invention. By 1881 the incandescent lamp had reached the stage of commercial utilisation.¹⁸

At first, electricity could only be generated on a very limited scale; separate plant had to be constructed for each new installation, only sufficient for the supply of a few lamps. One of the earliest installations, indeed the cradle of the modern power station industry, was the plant erected in a yard behind the Grosvenor Gallery in 1883 for the operation of the arc lamps in the gallery. The supply was successful, and applications were received from many in the neighbourhood for a supply of electric light, with the result that the small station became overloaded.

Soon larger plant was designed; in 1885 the Grosvenor Station came into service, with a capacity of 1,000 kilowatts supplying over an area extending from Regent's Park to the Thames, from Knightsbridge to the Law Courts.¹⁹

With the systems available at the time great difficulties of transmission of low voltage direct current were found. It was "impossible to enter upon a Central Station scheme with the certainty of either practical or financial success."²⁰ In fact, it was only when distribution of electricity over a wider area was attempted that the difficulties inherent in electricity supply became apparent. The whole trend of development was, therefore, towards the adoption of the comparatively small local government areas as suitable districts for electricity supply and accordingly towards the

¹⁷ For a short summary of the early scientific developments, see R. H. Parsons, *The early days of the Power Station Industry*, 1939; Rollo Appleyard, *History of the Inst. of El. Engineers*, 1939, pp. 58-67.

¹⁸ *Electrician* 8 (1881-82), p. 152.

¹⁹ R. H. Parsons, *loc. cit.*, p. 21; *The London Electric Supply Corporation Ltd.* (private publication).

²⁰ *Electrical Review* (abb. *El. Rev.*) 18, (1886) p. 245.

growth of numerous independent systems of small size.²¹ Even in 1891, a well-known engineer regarded the efficiency of a 2,000 h.p. steam engine as little higher than that of a 200 h.p. engine.²²

The enormous potentialities of electricity were early realised by scientists, who believed "that in the future it was destined to take a leading part in . . . illumination . . . and might be extensively used to transmit power as well as light to considerable distances."²³ Public interest in electricity was so great that in 1878 a cablegram from Mr. Edison, claiming the invention of an electric lamp, sent the gas shares on the London Stock Exchange tumbling down. In the years of relative prosperity from 1880-82,²⁴ promoters and speculators found the market for electricity shares an easy way of making quick profits. After the success of the Paris Electrical Exhibition of 1881, followed by the Crystal Palace and other exhibitions, money for new electrical enterprises was obtained without any difficulty and many companies were formed which paid high prices for patents and concessions.²⁵ Hardly any of the companies actually started to supply electricity, their main source of income being the sale of concessions and the foundation of subsidiary companies. There were warning voices which prophesied that such wild speculation must lead to disappointment, but they remained unheeded.²⁶ In 1880 fourteen companies were formed, in 1881 thirty-one, and in 1882 as many as 102. £23,000,000 were invested in electrical companies alone and most of this amount was lost.²⁷

III. THE ELECTRIC LIGHTING ACT, 1882

To supply electricity in a district it was generally necessary to lay cables under the public highway, and for this purpose Parliamentary sanction was required. Private Bills were accordingly launched to obtain the required powers, frequently on such terms as would have given a virtual monopoly to the promoting companies.²⁸

²¹ Sir J. F. Snell, Presidential Address to Section G of British Association, 1926, quoted *Engineering* 122 (1926), p. 194. Also *McGowan Report*, S. 12, 13.

²² R. H. Parsons, *loc. cit.*, p. 165.

²³ Report from *Sel. Com. on El. Lighting*, B.P.P. 1878-9, Vol. XI, p. 375.

²⁴ J. A. Schumpeter, *Business Cycles*, Vol. I, 1939, p. 380.

²⁵ C. E. Spagnoletti, Presidential Address, *Journal Society of Telegraph Engineers* (1885), p. 9.

²⁶ *Electrician* (abb. *El.*) 8 (1881-82), p. 424.

²⁷ S. Thompson, *Journal I.E.E.* 29 (1899-1900), p. 30.

²⁸ T. H. Farrer (Board of Trade) to Select Committee, reported *El.* 8 (1881-82), p. 430.

Parliament was not prepared to grant such sweeping powers over the heads of local authorities, and a Select Committee of the House of Commons was appointed in 1879 "to consider whether it is desirable to authorise municipal corporations or other local authorities to adopt any schemes for electric lighting."²⁹ The Committee examined the question and believed that the time was not yet ripe for Parliamentary action. They recommended full power for local authorities to experiment and opposed the claim made by some gas companies to have special rights to be entrusted with the supply of electricity. In view of the experimental nature of the new industry the Select Committee did not "consider that the time had yet arrived for granting private companies the right of breaking up streets without the consent of the local authority concerned."³⁰

The Board of Trade interpreted the Report as giving the local authorities a preference during a limited period for the installation and running of an electric lighting system and as restricting any monopoly given to companies to the short period required to remunerate them for their enterprise.

Within three years of the Committee's Report the extraordinary development in the promotion of electrical companies, all demanding privileges, made it advisable to consider general legislation in order to clarify the position and protect both the investor and the general public from unscrupulous exploitation. Two important public utilities, whose regulation might have served as an example for the legislator, namely gas and water, were held to be "oppressive monopolies" and "vested interests of every description, especially gas and water, were in bad odour."³¹ It was the firm determination of Parliament to prevent the growth of an electricity industry of a similar character.

A number of municipal corporations, including Manchester, demanded that the new industry should be developed by local authorities. It was obvious, however, that electricity was still a highly speculative undertaking and even a progressive city like Birmingham decided in 1882 against supplying electricity owing to the great difficulties involved.³² The justifiable desire of corpora-

²⁹ B.P.P. (1878-9), Vol. XI, p. 375.

³⁰ *Ibid.*, p. IV.

³¹ *El.* 9 (1882), p. 84.

³² H. C. Meyer, *Municipal Ownership in Great Britain*, p. 228.

tions to spare the ratepayer might delay experiments, and the Board of Trade was for this reason in favour of private enterprise entering the field of electric supply.³³ T. H. Farrer, the then Permanent Secretary to the Board of Trade, after suggesting in 1879 that every facility should be given to local authorities desiring to supply electric light (although he agreed that they were slow in adopting improvements)³⁴, considered later, in 1883, that Government management was unfitted for enterprises involving "scientific experiment." It was undesirable that a government should embark upon "speculative enterprise."³⁵

"The real pioneering must be done by private capital . . . and towns will not become manufacturers of electricity until the process is better understood."³⁶ The number of electricity supply companies founded at that time proves that public opinion was expected to reject complete municipalisation of electricity supply.

On the other hand, private enterprise was not to be allowed to build up a strong monopolistic position and local authorities should have an early opportunity of taking over the works established by the companies. The expectation of quick profits led to the suggestion by the Government and the acceptance by the companies of a very short licence period before a local authority should have the right to purchase an undertaking. The Electric Lighting Bill, 1882, drawn after the example of the Tramways Act, 1870, originally allowed for a period of only seven years, but this figure was raised to fifteen years in Committee.

Mr. Joseph Chamberlain pointed out in Parliament that it was suggested on behalf of the companies that a term of twenty-one years was necessary; that the Committee, however, had decided on fifteen years, guided by the reasoning that it was the bounden duty to accept the shortest term which at the same time would leave room for the development of these experiments. He added, on the authority of the companies concerned, that they were perfectly satisfied with the arrangements.³⁷

The companies, however, were apparently not quite so satisfied as Mr. Chamberlain had thought and their opposition found

³³ Mr. J. Chamberlain to Deputation of Corporations, Rep. of *The Times*, 6-12-82; also letter, *The Times*, 14-12-82.

³⁴ *Rep. Sel. Com. El. Lighting*, B.P.P. (1878-9), Vol. XI, q. 1659-61.

³⁵ T. H. Farrer, *The State in Relation to Trade* (1883), p. 29.

³⁶ *Ibid.*, p. 92.

³⁷ *Hansard*, 3rd series, Vol. 272, c. 611.

expression in letters to *The Times*³⁸ and lobbying in the House of Lords, with the result that the Government representative in the Lords Committee had to agree to an extension of the period to twenty-one years.³⁹

Strict insistence on competition was again thought to be a satisfactory safeguard against exploitation. As the Act of 1882 did not state this clearly, the Board of Trade issued a statement confirming that the permission to undertake the supply in any given area did not constitute an exclusive right,⁴⁰ and a clause was specially inserted in the Act of 1888 to make any misunderstanding impossible (Sec. 1).

On the contrary, the hope was expressed "that the local authorities would give as many licences as possible to as many companies as possible."⁴¹ The Act was welcomed as making amalgamation or arrangements of tariffs impossible⁴² and was accordingly greeted as "a vigorous attempt to make a stand against the creation of burdensome monopolies."⁴³ Any amalgamation or even close co-operation of companies was prohibited.⁴⁴

This insistence on competition appears as a retrograde step in view of the experience with other utilities, which had destroyed the unbounded belief in the beneficent results likely to accrue from competition.⁴⁵ Farrer, in his evidence before the Select Committee of 1879, had expressed his conviction that a monopoly would arise in time if light was to be distributed⁴⁶ and wrote in 1883 that "in none of the industries of more or less monopolistic character had competition proved completely successful."⁴⁷ In the short run, however, competition of different systems could be expected to encourage experiment and progress.

The Act was passed in August, 1882, as the *Electric Lighting Act, 1882*,⁴⁸ and provided for the establishment of "Electricity

³⁸ *The Times*, July 21 and 22, August 8, 1882.

³⁹ Lord Sudeley, *Hansard*, 3rd series, Vol. 273, c. 1105.

⁴⁰ Letter to *The Times*, 14-12-82.

⁴¹ *El. Rev.*, XI (1882), p. 63 (Editorial).

⁴² *Statist*, X (1882), p. 94.

⁴³ *El. Rev.*, X (1882), p. 94; *Economist* (1882), p. 443.

⁴⁴ Electric Lighting (Clauses) Act (1899), Schedule S. 3.

⁴⁵ W. A. Robson, *loc. cit.*, p. 324.

⁴⁶ T. H. Farrer, *Rep. Sel. Com. on El. Lighting*, B.P.P. (1878-9), Vol. XI, q. 1652.

⁴⁷ T. H. Farrer, *The State in Relation to Trade* (1883), p. 69; cf. Sir C. Boyle, *Ev. to Com. on El. Gen. Stations and Supply*, B.P.P., 1898, IX, q. 1824.

⁴⁸ 45 & 46 Victoria, ch. 36.

Undertakers"—either local authorities, companies or private persons—in two ways :—

1. By the grant of a Board of Trade licence for seven years, with the consent of the local authority in whose area the supply was to be furnished (Sec. 3 of Act). This was a novel type of licence and Mr. Joseph Chamberlain was accused in Committee of usurping unprecedented powers,⁴⁹ but he satisfied Parliament that this new institution had been recommended by a Committee in 1870 for experimenting and was designed to facilitate the development of electricity.⁵⁰

2. An alternative method of authorising a new undertaker was by means of a "provisional order" issued by the Board of Trade and subject to the confirmation of Parliament (Sec. 4). Provisional orders could be granted without the consent of the local authority, which was sufficiently safeguarded by the right to purchase the undertaking after twenty-one years or every seven years thereafter, at the "then value," i.e. the market value of the works and plant at the time of purchase.

The Act further provided that the licence or provisional order establishing an Undertaker should safeguard the public interest in an early development of the area by specifying a time limit within which certain mains would have to be laid down, often within two years, and by imposing an obligation on the undertaker to supply any potential consumer prepared to enter into a contract to take supply for a number of years and to pay the cost of installing electricity. The order also fixed a maximum price, but this was generally high, as competition was expected to safeguard the consumer from exploitation.⁵¹ Some critics expressed the fear that the Act might deter capitalists from investing money in the electrical industry, but the avidity with which concessions for the supply of electricity were sought, seemed to disprove such gloomy prophesies and confidence was expressed that private enterprise would not be discouraged.⁵² The companies hoped to recoup themselves quickly by keeping prices high at steadily falling costs, and probably hoped that many local authorities would not make use of their purchase rights. The rights of undertakers to break up streets, etc., were

⁴⁹ Col. Makins, *Hansard*, 3rd series, Vol. 272, c. 367.

⁵⁰ J. Chamberlain, *loc. cit.*, c. 573.

⁵¹ *El. Rev.*, 13 (1883), p. 93.

⁵² *Economist* (1882), p. 672; *El.* 9 (1882), p. 64

identical with those of gas companies ; in fact, the Act incorporated the relevant parts of the Gas Clauses Acts (Sec. 12).

The Result of the Act

As many as 69 provisional orders were granted in 1883, of which 55 were company orders.⁵³ None of the orders granted, however, were used and the number of new orders fell heavily to four in 1884. Apart from one in 1886, no further orders were granted until 1888. These figures indicate a remarkable falling off in enterprise and contemporary and later writers have claimed that the "electrical infant was strangled at birth by the Electric Lighting Act."⁵⁴ Had there been a trial, however, it is not likely that Parliament would have been found guilty of such a crime, as grave internal diseases combined with external causes would have been considered mainly responsible for his collapse.

It has been mentioned before how wild speculation expected results far beyond the capabilities of the young industry, and in this connection the words of a well-known engineer, Mr. W. H. Preece, deserve recording : "Electric company mongering and electric lighting finance have been a failure owing to the commission of every possible crime that commercial immorality could invent and every foolish act to which insane speculative mania could lay itself open."⁵⁵

Similarly, Col. R. E. Crompton considered the speculation of the early years and the restrictive legislation as the reason for the loss of England's lead in electricity, "the second undoubtedly very largely caused by the first."⁵⁶ The bubble had to burst, and even without the Act all the companies that passed into liquidation would have become bankrupt, probably with even greater losses.⁵⁷ Mr. Chamberlain was not alone in his opinion that the Act protected the public against bogus companies trying to obtain quasi-monopolies ; it certainly fulfilled the negative task of checking reckless enterprise.

Moreover, the stagnation in the new industry is not an isolated phenomenon ; on the contrary, it reflects rather accurately the general conditions of trade. "The years after 1882 were years of

⁵³ Meyer, *op. cit.*, p. 195.

⁵⁴ *Statist.*, XIV (1884), p. 95 ; *J. Soc. Tel. Eng.* (1885), p. 9.

⁵⁵ Paper to Soc. of Arts (1884), quoted *El. Rev.*, 14 (1884), p. 258 ; see also *El. Rev.*, 13 (1883), p. 245.

⁵⁶ *I.E.E. Min. of Proc. of Com. on El. Legislation* (1901), p. 32.

⁵⁷ *El. Rev.*, 15 (1884), p. 423.

depression within a long period of downward prices, which brought with it a depression of interest and profits and resulted in discouragement and lack of initiative in the world of business. The situation was so bad that there was in 1885 a full-dress enquiry into the depression of trade and industry."⁵⁸ The depression was worst in industries engaged on durable plant and did not cease until 1887.⁵⁹

It is not, therefore, surprising that industry did not adopt electricity in place of gas as an illuminant, especially as there was still doubt as to its reliability. The immediate outlook for the new industry was accordingly rather gloomy and it was obvious that electric light would not take the world by storm over night. The Act, based on the assumptions of the sanguine days of 1882, certainly did not encourage capitalists to invest their money in a new and unproven industry in which success, if it ever came, would be slow. Revision of the Act, especially of the clauses referring to purchase periods and terms, was advocated as necessary for encouraging enterprise.⁶⁰

IV. THE CONCESSIONS OF 1888

An agitation started, the electricity companies claiming equal rights with the gas companies, i.e. perpetual concessions subject only to a certain amount of Government control. A deputation to the Board of Trade stated that the companies had been too hasty in assuming that twenty-one years were sufficient, as an extraordinarily large proportion of that time must pass before an undertaking was in working order.⁶¹ A committee under the chairmanship of Lord Thurlow made proposals for the repeal of the compulsory purchase clause and for the introduction of a system of control by a sliding scale of profits and dividends as in the Gas Acts.⁶² These ideas formed the contents of a Bill introduced into the House of Lords by Lord Rayleigh in 1886.

The proposals met with strong opposition, as the antagonism to utility companies had by no means decreased. Local authorities originally opposed any revision of the Act and claimed that com-

⁵⁸ Clapham, *loc. cit.*, Vol. 3, p. 5; see also Schumpeter, *loc. cit.*, Vol. 1, p. 380.

⁵⁹ Clapham, *loc. cit.*, p. 6.

⁶⁰ Spagnoletti, *loc. cit.*, p. 12.

⁶¹ *El. Rev.*, 15 (1884), p. 423.

⁶² *El. Rev.*, 16 (1885), p. 257.

panies could recoup initial losses by later gains due to improvements in technique. Afterwards they agreed to an extension of the purchase period on condition that they should have the right of veto also in the case of provisional orders. Even if the political obstacles could have been overcome, a regulation by means of a sliding scale of prices and dividends would not have been a satisfactory protection of the public. The Board of Trade, which favoured this method of control for the gas industry⁶³ opposed the suggestion of introducing such a scale into the Electric Lighting Act on the grounds that the effectiveness of a sliding scale depended on the standard price; if this was fixed too high the consumer always had to pay a very high price for the commodity he received. The Board of Trade considered their knowledge of the cost of electricity distribution insufficient as yet to fix a fair price.⁶⁴

In 1886 two other Bills were introduced into the House of Lords, the one (by Lord Bury) proposing an extension of the purchase period to forty-two years and the inclusion of an allowance for "goodwill" in the purchase price, the other by the Government providing for an extension of the period to thirty years, or to forty-two years with the consent of the local authorities concerned. A Select Committee examined the Bills, but was faced with the unwillingness of the local authorities to accept a period of more than thirty years, and of the capitalists to take up lighting on such terms.⁶⁵ The Committee recommended the Government Bill, but owing to shortage of Parliamentary time neither this nor a Bill introduced next year by Lord Thurlow (similar to Lord Bury's Bill) were passed.

Lord Thurlow's Bill was reintroduced in 1888 and an amendment eliminated the word "goodwill" from the purchase clause, to forestall probable opposition in the Commons, although the purpose of the clause remained the same⁶⁶, to purchase the company undertakings as going concerns. In spite of criticism that local authorities forty-two years hence might forget the spirit of the Act, the companies were prepared to accept this amendment.

In June the measure was passed by Parliament as the *Electric*

⁶³ See above, p. 3.

⁶⁴ Sir Courtenay Boyle, *B.O.T. Ev. to Cross Committee* (1898), q. 2044. L.C.C. Attitude same (cf. *El. Rev.*, 24 (1889), p. 697).

⁶⁵ Meyer, *loc. cit.*, p. 228.

⁶⁶ Lord Thurlow, *Hansard*, 3rd Ed., Vol. 325, 23-4-88, col. 147.

Lighting Act, 1888⁶⁷ providing for purchase after forty-two years at the "fair market value ruling at the time of purchase," whereby the condition of the assets and the fact that they are ready for immediate use would have to be taken into account (1888 Act, Sec. 2). As a compensation to the local authorities, provisional orders henceforth required their consent, which could be dispensed with by the Board of Trade only for special reasons, necessitating a special report to Parliament (Sec. 1).

The Act was well timed. Experience gained during the last six years had helped to overcome the initial technical difficulties of electricity supply, so that the outlook for the investor could be regarded as distinctly hopeful. The public had recovered from the disappointment of its early speculative hopes and the Jubilee year 1887 saw the beginning of a brisk industrial revival with a fresh outburst of ship-building in 1888.⁶⁸ An abundance of capital was awaiting investment, whilst at the same time the demand for electric light increased. Lord Thurlow mentioned as one point in favour of his Bill that there was "a large army of unemployed" . . . and by passing this Bill, lucrative work might immediately be provided for thousands of men,⁶⁹ an argument which has proved very popular with subsequent promoters of Electricity Bills.

As the ill-fated Act of 1882 had been blamed by the companies as the only cause of their failure, its revision had great psychological importance and in itself increased confidence and hope of rapid progress. The passing of the Act was immediately followed by an outburst of activity so great as to raise the fear that "the growth of the industry might again be jeopardised by a wild Stock Exchange boom,"⁷⁰ but fortunately the development was based on a sound and healthy foundation. There was a considerable weeding out of schemes; in 1890, for instance, companies issued 479 notices to local authorities informing them of their intention to apply for licences or provisional orders, but the total number of applications to the Board of Trade from companies and local authorities amounted to 161, of which only 74 were granted.⁷¹ In passing,

⁶⁷ 51 & 52 Vict., ch. 12.

⁶⁸ J. H. Clapham, *Economic History of Modern Britain*, Vol. III (1938), pp. 5 ff; J. A. Schumpeter, *Business Cycles*, Vol. 1, p. 380.

⁶⁹ *Hansard*, 3rd Ed., Vol. 323, col. 140.

⁷⁰ *El. Rev.*, 24 (1889), p. 581.

⁷¹ Cf. B.O.T. *Report on Applications and Proceedings under the El. Lighting Acts*, B.P.P., 1906, CIX, No. 220.

it may be noted that 204 notices were served by a single company and its subsidiaries.

There were two outstanding features of the ten-year period of steady though somewhat slow growth of electric supply which followed the 1888 Act:—

1. The wide divergence of technical opinion on the usefulness of various systems of supply, of alternating or direct current, high or low pressures and frequency, which encouraged the installation of an extraordinary diversity of systems,⁷² many imported from America and Germany. An immediate result was that the standardisation and adoption of mass production methods in the electrical manufacturing industry, both for generating plant and appliances, was rendered impossible, with the consequence that the cost of electrical products remained high and that the British industry was not competitive on the world market.⁷³

2. The important part which municipal enterprise played in its development. Up to 1900, just before the power company schemes introduced new problems, 639 provisional orders had been granted of which 518 were still in force. Of these 354 were held by local authorities and 164 by companies,⁷⁴ but nearly one-third of the orders granted to local authorities had not been proceeded with by 1900.⁷⁵ Their enterprise can be judged by the fact that in the three years from 1895-98 alone investment in municipal electricity increased from £1,772,000 to £6,979,000, whilst the corresponding figures for companies were £4,335,000 and £7,996,000 respectively, showing an impressive growth of municipal activity.⁷⁶

V. THE TREND OF DEVELOPMENT IN LONDON

The local organisation of electricity was generally in accordance with the existing technical possibilities, medium and large towns formed a sufficiently large area for satisfactory development. The case of London is an important exception, where owing to peculiar political and administrative arrangements there was no single

⁷² J. S. Highfield, *Address to R.S.A.* (7-5-1919), Reprint p. 4.

⁷³ Sir Hugo (later Lord) Hirst, *El. Suppl. Fin. Times*, 19-10-1925.

⁷⁴ *El. Com. 1st Annual Report*, 1920, p. 6.

⁷⁵ E. Garcke, *Ev. to Com. on Mun. Trading*, 1900, B.P.P. 1900, VII, 305, q. 1180.

⁷⁶ A. B. Mountain, *Pres. Add., Proc. I.M.E.A.*, 1900, p. 11.

comprehensive municipal authority but a multitude of smaller bodies divided by artificial boundaries.

For an understanding of the particular problem with which electricity supply in the Metropolis has been faced, it will be necessary to indicate as a background the complexity of London Government. What is known as the Administrative County of London developed out of a large number of small communities which at an early stage formed for all practical purposes a unit and called for unified administration. This was stressed as early as 1837 by the Royal Commission on Municipal Corporations.⁷⁷ In the 1870s the movement for municipal reform grew and a number of Reform Bills were introduced.⁷⁸ When in 1874 *The Times* called for municipal water and gas supply in the Metropolis,⁷⁹ it pointed out that the reform of London Government was overdue "to get rid of the old evil of separate and conflicting municipal jurisdictions . . . with their many staffs of officials, each expensive to keep up and with aims and interests divergent from those of the rest and thus fatal to efficiency." Gladstone asked for support of the London Reform Bill of 1884 on the ground that it had been the absence of a single municipality for the Metropolis which had thrown gas and water supply into the hands of profit-making companies.⁸⁰

Progress, however, was very slow; the Metropolitan Management Act of 1855 established in place of the 99 parishes, 23 vestries and 15 district boards which, in turn, elected the Metropolitan Board of Works. This indirectly elected body had control of the sewage system and a few other duties⁸¹ and was soon widely accused of corrupt practices, which reinforced the demand for reform. There was, however, powerful opposition to the creation of a strong central authority for the capital of the Empire, as this would tend to destroy the privileges of the City and was bound, in the long run, to give the millions of working-class inhabitants of the southern and eastern suburbs a predominant influence. No wonder that the Reform Bills "met with the most determined opposition from the City and were defeated."⁸²

⁷⁷ W. A. Robson, *Government and Mis-Government of London* (1939), p. 23.

⁷⁸ H. Finer, *English Local Government* (1933), p. 471.

⁷⁹ *The Times*, 7-10-1874.

⁸⁰ *Hansard*, 3rd series, Vol. 290, c. 550.

⁸¹ W. A. Robson, *loc. cit.*, p. 57.

⁸² H. Finer, *loc. cit.*, p. 471.

The municipalisation of public utilities in London was clearly bound up with the existence of a suitable central authority, and it would appear that the utility companies did their utmost to prevent its creation. Robson states that the "behaviour of Parliament towards the Metropolis during the 19th century is difficult to explain except in terms of the lobbying activities of the public utility companies which plundered the consumers in the wealthiest city of Europe."⁸³

When the Local Government Act of 1888 created County Councils, bodies designed to take over certain duties for large districts consisting of towns and sparsely-populated rural areas, the London County Council was formed on similar lines. Their powers did not extend to the large towns: the County Boroughs remained practically independent. In a similar way the L.C.C. was merely superimposed over the existing confused structure with hardly more powers than the Metropolitan Board of Works. The City of London was included only for a few administrative purposes, but remained otherwise a separate body.⁸⁴

At any rate, London had at last been granted a central democratically elected governing body which had the interest of the whole at heart and was animated by the ambition to grow in power and acquire new functions. The Progressive Party which was in power from the beginning until 1907, advocated the abolition or reduction in number and importance of the other local bodies, but found strong opposition to this view in Parliament, where, during this period, Liberal Governments were in power only from 1892-95 and from 1905.⁸⁵

The logic of developments was so obviously in favour of the large central body that the Salisbury Government considered it necessary to strengthen the parochial forces in London by granting them new privileges and added prestige. The London Government Act of 1899 created the Metropolitan Boroughs and thereby encouraged the growth of a local feeling opposed to a London pride.⁸⁶ According to Robson the main purpose of the Bill was "the undermining of the interest and authority which the London County Council had aroused . . . by strengthening and magnifying

⁸³ W. A. Robson, *loc. cit.*, p. 156.

⁸⁴ *Ibid.*, p. 80.

⁸⁵ Sir Harry Howard, *The London County Council from Within* (1932), pp. 23, 35.

⁸⁶ Cf. A. G. Gardiner, *Sir John Benn and the Progressive Movement*, p. 256.

the district councils." Nothing was done to give the L.C.C. power to over-ride the parochial views in the interest of the Metropolitan community as a whole.⁸⁷

Henceforth there were three forces directly concerned in the administration and development of public utility services in London, the L.C.C., the Metropolitan Boroughs, and the companies, of which two usually combined to defeat any scheme of the third. As a result, compromises were reached which did not encroach upon the rights of any interested party, but which also failed to solve the problem.

The early years of speculative activity and concession hunting, long before the London County Council came into existence, were marked by the efforts of a few large companies, such as the Metropolitan Brush Electric Light and Power Company, and the Edison and Swan companies, to obtain control over a large part of the London area. Local authorities viewed with suspicion efforts which might lead to the growth of private monopolies, and public opinion generally was in favour of encouraging competition between companies and different systems.⁸⁸

The Board of Trade granted 32 provisional orders under the 1882 Act, but in 1884 25 were revoked, 23 because the authorised undertaker, the Metropolitan Brush Co., had gone into liquidation. The remaining companies delayed the commencement of supply. In 1887, possibly anticipating the passing of the Amendment Act, 1888, new interest was noticeable and a great number of applications for provisional orders were made. Some companies such as the Kensington Court Electric Supply Company started the supply of electricity without special Parliamentary powers, by obtaining permission to lay cables in existing subways.⁸⁹

The London Electric Supply Corporation, formed in 1887, took over the Grosvenor Gallery Station as the nucleus for supplying electricity to London on a large scale. A vast generating station was to be erected at Deptford, the mains were to run to London on railway rights of way with the permission of the companies concerned. For the purpose of retail distribution the company applied for powers to use the streets of 24 different local authorities.⁹⁰ The

⁸⁷ W. A. Robson, *loc. cit.*, p. 93.

⁸⁸ *Statist.*, XII (1883), p. 7.

⁸⁹ R. H. Parsons, *loc. cit.*, p. 89.

⁹⁰ *Ibid.*, pp. 21-9.

scheme could be considered as prophetic in its appreciation of the importance of large-scale supply, but its creator, Ferranti, had to overcome many difficulties and misfortunes before his ideas could be translated into reality.

Hardly less ambitious regarding the range of activities was the Metropolitan Electric Supply Company, first registered in 1887 as the South Metropolitan Electric Supply Company, which applied for licences covering an extensive part of London.

The Board of Trade was unwilling to take a decision which would vitally affect the future of electric supply in the Metropolis without Parliamentary sanction, especially in view of the likelihood of a reform in the constitution of London government. The companies were, therefore, informed that licences would not be granted and that they would have to apply for provisional orders.⁹¹

The Board of Trade further instructed Major Marindin to consider the various applications and in 1889 a report was issued by him in which he came to the following conclusions :—

(a) Objections of local authorities to companies undertaking supply in their area should not be accepted by the Board of Trade unless the authorities were themselves prepared to supply within a short space of time.

(b) The Metropolitan area was one unit which might shortly come under central control as far as roads and streets were concerned ; the conditions regarding period and purchase terms should therefore be identical as far as possible.

(c) The application by a few companies to cover large areas was favourably commented upon owing to their large resources and capable management, but the desirability of competition in the abstract was stressed. Competition from gas companies would not be effective, as the two types of illumination were thought to appeal to different classes of consumers.

The scheme adopted by the Vestry of Kensington of dividing the area amongst different companies, each receiving a temporary monopoly with the threat of competition as inducement to efficiency, was not recommended. It was felt that only in the case of very bad service would a competitive company be introduced and that it could only commence supply after a considerable time lag.

⁹¹ Letter dated 23-11-1888, quoted *EL*. 22 (1888-9), p. 256.

(d) Competition of many companies was not desirable and the number in any one district should be restricted to two, one supplying direct current for lighting and the other alternating current for power.⁹²

The Report was examined by the interested parties, one of which was the newly-created London County Council. In their June meeting, 1889, the Council accepted the recommendations of its Lighting Committee, which in general approved of the Report, but demanded that certain rights and duties of the old Vestries should be handed over to the L.C.C.⁹³

The recommendations of the Marindin Report were the basis of the provisional orders finally granted and confirmed by Parliament, and soon afterwards the companies set to work.⁹⁴ The L.C.C. was given the task of testing meters, inspecting lines, etc., but the purchase rights over companies remained with the Vestries and later the Boroughs. They were only taken over by the L.C.C. in 1908. Sixteen local authorities obtained provisional orders, only two of which had competition from companies. Of 14 companies there were only five instances where two were granted concurrent powers over the same area.⁹⁵ Competition was therefore on a restricted scale and, as will be seen later, was not effective.

The Marindin enquiry was the first of many attempts to settle the electric supply of London on rational lines. Controversy centred round the question of the most suitable system of distribution and there was little support for alternating current by experts who raised many engineering objections. As Mr. (now Sir Archibald) Page pointed out in 1928, "to his lasting credit Major Marindin expressed himself as being wholeheartedly in favour of encouraging any experiment that was likely to be for the public benefit."⁹⁶

VI CONCLUSIONS

Let us recall in conclusion the main factors determining the growth of the electric supply industry in Great Britain during the first two decades of its existence, years which largely determined the whole future of the industry.

⁹² *Marindin Report*, pp. 19 and 20; B.P.P. (1889), LXX, 83.

⁹³ *El. Rev.*, 24 (1889), p. 697; *El.* 23 (1889), p. 106.

⁹⁴ *El.*, 24 (1889-90), p. 219.

⁹⁵ *Spec. Rep. of Sel. Com. on the L.C.C. Electric (Supply) Bill*, 1906.

⁹⁶ Presidential Address, *J.I.E.E.* 66 (1928), p. 1.

On the technical side difficulties of transmission restricted the area of supply from a generating station to a small district, such as the parish. A wide divergence of technical opinion on the usefulness of various systems encouraged the growth of small independent networks which later became an almost insuperable obstacle to any unification and standardisation of electricity supply.

On the political side a strong tide of municipal high feeling and enterprise coupled with a deep suspicion of the monopolistic tendencies of companies pressed for legislation which at the time was well adapted to the technical conditions. When later the successful development of electric supply called for units larger than local government areas, the prohibition of amalgamation of private companies and the civic pride in their own undertakings by the local authorities raised formidable obstacles to progress. The growth of individual generation and independent undertakers, each pursuing an unco-ordinated and unrelated policy of development was a natural process,⁹⁷ but it created powerful vested interests in the *status quo*.

⁹⁷ *M.O.T. Rep. of Com. on Supply of El. Energy (Weir Report)*, 1927, s. 20.

CHAPTER II

THE MUNICIPAL TRADING CONTROVERSY

AT the turn of the 19th century the British electricity industry became the battle ground of violent technical and political disputes, which, by their mutual influence, so complicated the issue that a satisfactory solution of the problems involved became practically impossible. On the technical side scientific advance had gone far beyond the existing local undertakings with small-scale generating plant. Reorganisation and concentration was essential for the progress of the industry and would have been a relatively easy matter had it not been for the hostility between the protagonists of private enterprise and the well-organised body of municipalities pressing for an expansion of public control in industry.

Local authorities feared the monopolistic tendencies of the electricity company promoter, whilst the companies felt threatened by the growing ambition and power of municipal socialism and denounced and tried to discredit public enterprise by all means at their disposal.

As a result, what should have been a comparison of the economics of small-scale and large-scale supply, developed into a dispute on the merits of private versus public enterprise, in which the technical aspect was only of secondary importance.

In order to understand the reasons for the frustration of the power company schemes which originated in the first decade of the 20th century, it will be necessary to examine briefly the achievements and limitations of municipal enterprise.

I. THE CHALLENGE OF MUNICIPAL SOCIALISM

The growth of municipal electricity supply was one of the outstanding symptoms of the general trend towards collectivism referred to before. Municipalities passed from small regulating

and controlling authorities into "associations of consumers co-operating for the actual supply of common means, eliminating the contractor, middle man or profit making capitalist."¹

The Fabian Society, founded by Mr. and Mrs. Webb, G. Bernard Shaw and Graham Wallas, and other progressive thinkers propagated a Socialist society built upon the basis of municipal enterprise, and strongly advocated the extension of public services, especially in the field of public utilities.

It is important to remember that the Fabian social philosophy was not necessarily shared by those who believed in municipal trading; on the contrary, "the advocates of municipalism often were not Socialists at all, but for the most part worthy business men."² The belief in citizen enterprise cut across political party lines and found no stronger champion than the conservative City of Birmingham. Sidney Webb dismissed private enterprise from his consideration altogether and drew a line between municipal socialism and consumers' co-operatives. He considered as a suitable field for public management:—

(a) services which are necessarily or should, in the public interest, be monopolies;

(b) services involving the exercise of exceptional and arbitrary powers, such as the opening of highways; and

(c) services which the public good requires to be conducted irrespective of the cost of production.³

Apart from these services which could all be classified as public utilities, he referred to another range of activities undertaken as a consequence of the "progressive integration of processes characteristic of modern industry; where a public authority can conveniently produce the articles or execute the works called for by its functions without the intervention of a contractor, this integration of processes will, all things being taken into account, probably be found advantageous and economical."⁴

Without looking for such theoretical justification, local authorities found it increasingly convenient and advisable to carry out tasks subsidiary to their normal functions. The Local Government Act of 1888 gave general encouragement, but did not authorise muni-

¹ Sidney Webb, *Some Facts and Considerations about Municipal Socialism* (1894), p. 1.

² *El. Rev.*, 47 (1900), p. 712.

³ Sidney Webb, *loc. cit.*, pp. 2-3.

⁴ *Ibid.*, p. 4.

cipalities to carry out trading activities. Local authorities had to apply for provisional orders or introduce special Acts. The Board of Trade, which had previously been in favour of private enterprise, revised its attitude and decided to grant provisional orders to local authorities in preference to competing companies.⁵ The statutory restrictions remained which prohibited local authorities any activity not specially permitted by Act of Parliament; municipalities, therefore, often applied for wide powers without necessarily wanting to use them, only in order to have a freer hand in the future. Thus local authorities applied in 1898 for power to manufacture and sell such goods as lamps, accumulators and machines, whereas in 1900 other applications covered the supply and manufacture of fittings, refrigerators, ice and the construction of dynamos.⁶

Municipal ambition saw no clear limits to its functions and thus laid itself open to the charge that it represented a challenge to private enterprise of any kind. Under this flag the small artisans and tradesmen might unite with the big companies in a common fight against what they considered a threat to the foundation of Society. After a vigorous paper by Mr. T. H. Davies sharply denouncing public management in industry,⁷ a "Liberty and Property Defence League" was founded which caused 400 or 500 petitions to be presented to Parliament in 1899 alone, all demanding an inquiry into the development and limitations of municipal trading.⁸ An "Industrial Freedom League" was formed for the purpose of combating local authorities; it did not distinguish itself by any excess of fairness or tactfulness towards the other side⁹ and suggested that the Board of Trade should not accept a local authority as the properly elected representative of a community, but should ascertain by local enquiry the sentiment of the ratepayer before granting a provisional order.¹⁰ The spokesmen in these campaigns were often, and not unnaturally, the same men who, as promoters of power companies, demanded and were dependent on the co-operation of local authorities. The fear was expressed that the collectivist trend would lead to the "wreck of the electrical industry and the undoing of that edifice of commercial and industrial

⁵ B.O.T. Report (1890), quoted *El. Rev.*, 27 (1890), p. 14.

⁶ *App. to Rep. of Jt. Sel. Com. on Mun. Trading*, B.P.P. (1900), VII, 305.

⁷ *J. Soc. of Arts* (1898-9), p. 224.

⁸ *The Times*, 27-12-1901, p. 2.

⁹ *Cf. El.*, 59 (1907), p. 369.

¹⁰ *El. Rev.*, 51 (1902), p. 43.

supremacy based on individual enterprise, which is the pride of the Anglo-Saxon race."¹¹

Partly owing to such pressure, the Government appointed, in 1900, a Joint Select Committee on Municipal Trading¹² which took extensive evidence, but was prevented by the close of the Session from issuing a report. It was not reconstituted until 1903, and then made certain recommendations regarding the auditing of local government accounts without, however, pronouncing on the main issue, the proper limits of municipal enterprise.¹³

In 1907 an L.C.C. election, fought on the issue of municipal electricity supply, led to a complete rout of the Progressive party accused of wanting to speculate with the ratepayers' money; even if, according to Bernard Shaw, the effect of the election was a clean sweep of those Liberals who had been the most determined opponents of municipal socialism in the previous Council (whilst the defenders of that system were returned to the L.C.C.)¹⁴, the new L.C.C. was less ambitious and failed to reach a satisfactory solution for the London electricity problem. Anti-municipal feeling was stated to be growing in Parliament in 1903, when gas interests succeeded in inserting the "Bermondsey Clause" into the Willesden Bill,¹⁵ and large towns like Bristol and Bath were included in a power company area.

In general, however, the power of the local authorities and their range of trading activities did not diminish, largely owing to the influence in Parliament and outside of the municipal associations, which were described by their opponents as "gigantic monopolies for strangling private enterprise."¹⁶

II. THE ECONOMIC RECORD

It cannot be the purpose of this survey to subject the arguments for and against municipal enterprise to a detailed examination,¹⁷ but it may be of interest to refer to some of the contemporary opinions. The opponents complained of the lack of initiative, the

¹¹ *El. Rev.*, 48 (1901), p. 349.

¹² *B.P.P.* (1900), VII, 305.

¹³ *B.P.P.*, 1903 (270), VII, p. 1.

¹⁴ G. B. Shaw, *Common Sense of Mun. Trading*, Fabian Socialist Series, No. 5, 1908, p. IX.

¹⁵ See below, p. 30.

¹⁶ *Parl. Deb.*, 4th Series, 1900, Vol. 79, c. 1374.

¹⁷ For this, cf. H. Finer, *Municipal Trading*, 1940.

inefficiency and inelasticity of inexpert bodies which, on the strength of political elections, were charged with highly technical tasks; municipalities, they claimed, could not embark upon new enterprises until others had shown that they were non-speculative; they could not take risks that may legitimately be taken by private enterprise.¹⁸ Defenders of municipal enterprise stressed the cheap credit of local authorities, and the absence of mis-appropriation of capital which was incidental to the formation of some companies.¹⁹ Whilst they did not deny the superiority of the small individual *entrepreneur*, they found little to choose between a joint stock company and a local authority on the score of efficiency; in fact, they could not conceive of anything more crushing on the energies of the individual than huge companies with large capital.²⁰ Even experts favourable to private enterprise complained that the Board of Directors of many companies was hopeless, as it was mostly constituted of men who knew little or nothing of the business they were supposed to direct.²¹

Each side produced masses of statistics in order to prove their greater efficiency. There were attempts to frighten ratepayers by referring to municipal investments as debts and the *Electrician*, generally an upholder of private enterprise, objected to a leaflet issued by the "Industrial Freedom League" as referring only to cases where, for local or other reasons, the financial results had not been brilliant.²² There can be no doubt about the remarkable success of municipal electricity supply,²³ "private enterprise in electricity supply could not have done more, and we doubt whether it would have done as much."²⁴ The witnesses before the Municipal Trading Committee generally agreed with this opinion; even Mr. Emile Garcke, a promoter of many electricity companies, declared that he was in favour of the municipalisation of industries which had for their object the rendering of a public service, such as

¹⁸ Cf. Amongst many others, a statement of A. A. C. Swinton to I.E.E. Committee on Electrical Legislation, 1901, *Min.*, p. 137.

¹⁹ *Traction and Transmission*, Vol. I (1901), p. 306.

²⁰ G. Pearson, *Proc. M.E.A.* (1899), p. 26-7.

²¹ P. H. Dawson, I.E.E. Com. on El. Legislation, *loc. cit.*, p. 184; cf. G. B. Shaw, *loc. cit.*, *passim*.

²² *El.*, 39 (1907), p. 369.

²³ J. S. Highfield, *Supply of Electricity*, 7-5-1919, reprint, p. 5; cf. *El. Rev.*, 45 (1899), p. 661; *El.*, 46 (1900), p. 663.

²⁴ *El. Rev.*, 47 (1900), p. 712.

electricity supply, as long as the enterprise was not carried out for profit.²⁵

On the average, costs and prices were lower in municipal undertakings, but it would be rash to draw the conclusion that the areas supplied by companies would benefit to the same extent from municipal management. The cost of electricity supply depends on so many variables, e.g. technical conditions, density of population, importance and value of local industries and their use of electric power, etc., that it is practically impossible to make a ready comparison between one undertaking and another.²⁶ This is not to say that a comparison could not be carried out at all—many important measures of electricity reorganisation were later based on cost comparisons of this nature—but certainly cost and production statistics alone were not sufficient for drawing reliable conclusions. For our present purpose the negative generalisation will be adequate that the record of municipal electricity supply by the end of the old century does not justify the accusations levelled against the public management of utilities, but on the contrary is evidence of an efficiency and initiative in many cases equal to the best of the company undertakings.

III. SPECIAL CHARACTER OF PUBLIC SUPPLY

The underlying purpose of municipal enterprise is fundamentally different from private trading. It substitutes the idea of communal service for the profit motive, and accordingly requires a different control from that of joint stock companies. "The corporation or public body, as distinguished from a private company, has not to make a profit. They have to supply, both as regards quality and quantity, the articles upon the cheapest terms upon which they can supply them."²⁷ The electricity legislation of 1882 and 1888 encouraged competition between supply undertakings for the protection of the consumer against exploitation. There was no need for such a safeguard with a public electricity undertaking, and local authorities strongly opposed any attempt of companies to enter into com-

²⁵ *Ev. to Mun. Trading Comm., loc. cit.*, p. 191, q. 1118.

²⁶ J. S. Highfield, *loc. cit.*, p. 7; H. Finer, *loc. cit.*, p. 31.

²⁷ *Birmingham v. West Bromwich, Improvement Commissioners*: 2BO, 1879; but cf. E. Cannan, Ought Municipal Enterprise be allowed to Yield a Profit, reprint in *The Economic Outlook*, 1912.

petition with them.²⁸ On the other hand, electricity and gas companies claimed that "it was contrary to the public interest to allow company undertakings to be undermined by a rate-aided competition."²⁹

It was a Parliamentary rule laid down by the Chairman of Committees that when a local authority had undertaken the supply of electricity, and was doing its duty, Parliament ought not to grant a provisional order to any company permitting a competitive supply in that district.³⁰ At the same time, Parliament had never permitted competition by local authorities against a company undertaking, except in cases where it was possible to show that the company had failed to give efficient supply. Thus, whilst the Vestry of Nottingham was empowered to compete with a supply company for this reason, Parliament refused to confirm a provisional order granted by the Board of Trade to St. Marylebone, notwithstanding the fact that serious complaints had been made of the efficiency of the company supply.³¹ This constituted a serious restriction of the sphere of competition and may have been due to the desire of Parliament to reduce the causes of friction between municipalities and companies to a minimum, coupled, perhaps, with the growing appreciation that competition in electricity supply was ineffective and undesirable.

The difference between municipal and company trading is most clearly shown by the part played by profits and losses in evaluating the efficiency of an undertaking.

The primary aim of a company is to reap *profits* for distribution to its shareholders; similarly, some local authorities handed over any surplus to their ratepayers by using it in relief of rates. The explanation for this policy was that at least a part of the surplus was due to the advantages of public enterprise, and should, therefore, be considered to belong to the ratepayer at large.³² With a rare unanimity enlightened opinion from the extreme municipal Socialists to die-hard individualists agreed that the object of municipal

²⁸ Resolution of the Manchester and Liverpool Councils, Report, *El. Rev.*, 44 (1899), p. 270.

²⁹ *El.*, 41 (1898), p. 255.

³⁰ *Parl. Deb.* (1899), 4th Series, Vol. 67, c. 1187.

³¹ *Ibid.*, c. 1183; cf. *Rep. of Mun. Trading, loc. cit.*, q. 68.

³² Article on Mun. Trading in *Traction and Transmission*, Vol. I (1901), p. 205.

trading was to provide public service at cost price without the object of relieving rates.³³

The universal adoption of this principle would, no doubt, have made municipal trading less attractive to those who used it as a method of indirect taxation. The Birmingham Town Clerk feared that it would lead to a very large extension of Socialist practices by putting more burdens on the large ratepayer,³⁴ but in Birmingham, as much as in other industrial cities, cheap motive power was of major importance for the large factory owners who might thus be compensated for any sacrifice imposed upon them by higher rates. A notable exception was Edwin Cannan, Professor of Economics at London University, who did not want the trading activities of municipalities restricted to services of general utility and considered it sufficient reason, if any particular service could best be rendered by a public body. Even speculative enterprises should be undertaken, on condition that the ratepayer had an equal chance of gain and of loss. Any other solution would amount to a bounty which was economically undesirable.³⁵

We need not investigate the wide implications of such a policy which places a local authority on a level with joint stock companies and makes the ratepayer a compulsory shareholder, but it leaves unanswered the strongest point advanced in favour of municipal enterprise, namely that certain services are so important for the general economic life that the most complete and progressive development at the lowest cost should be assured.

A financial *deficit* casts the shadow of bankruptcy over a joint stock company, and this possibility was frequently used to discourage the public from municipal enterprise. Was it right to force the ratepayer to back a speculative enterprise, and especially was it not grossly unfair to force him into subsidising rate-aided undertakings which might actually compete with his own work? Gas companies were often large ratepayers and in this capacity asked for special protection against municipal electricity.

In 1903, on the pressure of the local gas company, a stipulation was inserted in the Willesden General Powers Bill that charges of the electricity undertaking should be adjusted to meet the

³³ Cf. G. B. Shaw, *Common Sense of Mun. Trading*, p. 86; J. C. Pearce, Presidential Address, *Proc. I.M.E.A.* (1909), p. 7.

³⁴ *Ev. to Mun. Trading Comm., loc. cit.*, q. 1949.

³⁵ E. Cannan, *loc. cit.*, pp. 157-169.

expenditure after a period of 12 months. This clause was likely to strangle the undertaking rather than ensure efficient management, as an initial loss cannot be avoided in many a new undertaking. Companies, as well as municipalities, worked at a loss for at least the first year and frequently for a much longer period.

In the discussion on the so-called "Bermondsey Clause," the Secretary to the Board of Trade warned that any clause compelling an authority to raise charges in order to meet deficits, would tend to restrict its developments, and that a reduction of prices was the best way to recover losses. The clause was accordingly modified to stipulate a revision of charges, so far as reasonably possible, after five years in the case of new undertakings, and every three years afterwards,³⁶ a protection for the pockets of the ratepayers without seriously hampering the development of the industry.

The requirement of financial self-sufficiency of public utility undertakings was, however, not generally accepted; on the contrary, Sidney Webb considered it one of the reasons in favour of municipal Socialism that it could supply below cost price if the public interest required it,³⁷ and Mr. Bernard Shaw stated that an apparent loss might really mean a huge profit to the public.³⁸

Conditions are conceivable where an enterprise cannot be undertaken without being subsidised for considerable periods. If such an enterprise is in the interest of the community, it may be advisable to support it. The flight from the land which assumed serious proportions during the early years of the 20th century may be quoted as an example. If the rapid and unplanned growth of towns was undesirable from a social and economic point of view, and if this trend could be checked by fostering the growth of rural industries, cheap electric power and traction was an essential condition of success. Rural electrification was one of the main arguments in favour of the new power companies, but it proved generally unprofitable from a purely commercial point of view, as is shown by the necessity for carrying out experiments with Government assistance as late as 1930.⁴⁰ Possibly rural development could only

³⁶ Report in *El.*, 53 (1904), p. 399.

³⁷ S. Webb, *Some Facts and Considerations about Municipal Socialism* (1894), p. 2.

³⁸ G. B. Shaw, *The Common Sense of Municipal Trading*, p. 38.

³⁹ Cf. *Minutes of Proc. of I.E.E. Committee on Electrical Legislation* (1901), p. 19; *El. Rev.*, 50 (1902), p. 725; *Parl. Deb.* 4th Series (1907), Vol. 174, c. 441.

⁴⁰ See below, p. 232 ff.

be achieved through a public body either carrying out the supply at a loss or subsidising private undertakings. It would, therefore, be incorrect to consider a public supply undertaking working at a loss as necessarily inefficient. From a book-keeping point of view, it may be preferable to arrange for special grants towards the undertaking and to insist on self-sufficiency with this grant, so as to have an accurate control of the extent of subsidy involved, but the principle holds good that under certain circumstances public enterprise may have to be carried on at a loss.

IV. DELAY AND OBSTRUCTION

Municipal electricity supply, especially in large towns, was undoubtedly efficient, but were there not many small local authorities delaying the developments of electricity and obstructing private enterprise? Mr. R. P. Sellon showed in an address to the London Chamber of Commerce in 1901 that, of the 438 provisional orders granted up to 1900, 366 were in the hands of local authorities, of which nearly two-thirds were still in abeyance.⁴¹

There can be no doubt about the existence of a certain dog-in-the-manger attitude, especially amongst smaller authorities; it was generally agreed that municipalities should be called upon to exercise their powers within a reasonable time or forego them,⁴² in fact, the provisional orders usually included stipulations against delay by reserving to the Board of Trade the power of repeal, if supply was not given within the specified period, or of granting companies provisional orders for the same area. The Government was, however, unwilling to antagonise the powerful body of local government interests, and a number of instances are recorded where more than five years passed before supply commenced.⁴³ A clause providing for the automatic revocation of power upon the expiration of a period stipulated in the provisional order appeared the best guarantee of early development,⁴⁴ but was not adopted. In later years, however, the Board of Trade took a stronger attitude by threatening the rescission of provisional orders if the development of supply specified was not carried out.

In the case of small bodies the delay was not always caused by a

⁴¹ Quoted in *El. Rev.*, 50 (1902), p. 35.

⁴² Jt. Committee on Mun. Trading, *loc. cit.*, q. 2822.

⁴³ Meyer, *loc. cit.*, pp. 255 ff.

⁴⁴ Cf. *El.*, 25 (1890), p. 1; *El. Rev.*, 50 (1902), p. 5.

lack of interest or obstructionism; it was often on the well-considered advice of consulting engineers, who discouraged the authority from wasting money on small and uneconomic plant; this delay, in fact, was one of the greatest opportunities for power companies prepared to give bulk supply from large stations.

Local authorities could not be blamed for hesitating before embarking upon a large investment involving considerable risks, but they were not justified in preventing companies prepared to carry out the task from giving a supply.

As the 1888 Act gave the local authorities a virtual veto against the authorisation of private supply undertakings by the Board of Trade, which the Board hardly ever overruled on the ground that the local authorities knew what was best for their districts,⁴⁵ any local authority could preclude any company from entering the field without having to engage in the supply of electricity itself, at least for some time. A deputation of the Institution of Electrical Engineers asked for a prohibition of the "injudicious action of local authorities in opposing electrical progress because they had already risked ratepayers' money on gas works," and urged that "local authorities should not have power to prevent schemes from going before Parliament on their own merits."⁴⁶ Financial interest in local gas companies by local council members was as frequently the reason for opposition to new electrical ventures as the existence of a municipal gas undertaking, and it cannot be denied that the development of electricity was handicapped in many instances for narrow and unjustified reasons. There was general condemnation of this attitude, which constituted a serious obstacle to progress.⁴⁷

The chairman of the West Ham Electricity Committee suggested that an objection should only be accepted if the local authority was prepared with a counter-scheme to commence work within 12 months, failing which the Board of Trade should transfer the provisional order to the company which originally applied for it.⁴⁸ The Cross Committee⁴⁹ recommended that the "provision of the 1888 Act requiring consent of the local authority as a condition precedent to the granting of a provisional order should be amended.

⁴⁵ Cross Report, B.P.P. (1898), IX, No. 213, q. 13, 78, 79.

⁴⁶ J.I.E.E., 31, (1902) p. 1323; *Jt. Sel. Com. on Mun. Trading, loc. cit.*, q. 1556.

⁴⁷ *Ibid.*, q. 2822.

⁴⁸ Alderman Ivey, *Min. of Proc. of I.E.E. Committee on Electrical Legislation* (190 q. 291).

⁴⁹ See below, p. 44.

The local authority should be entitled to be heard by the Board of Trade, but should not have a provisional veto only to be dispensed with in special cases by the Board of Trade."⁶⁰ The acceptance of this proposal by Parliament would have meant a curtailment of the privileges of local authorities, and on municipal pressure such an amendment was omitted from the Act of 1909. The Power Company Acts, however, designed to overcome the limitations of local authority boundaries, left the power companies free from municipal interference and control.

Gradually the attitude of local authorities became more helpful, and the *Statist* welcomed their later activities in committee rooms, which secured many advantages in the public interest.⁶¹

V. CONCLUSIONS

During the period in which local small-scale electricity generation was satisfactory and the boundaries of large and medium-sized towns covered an adequate area for electricity supply, local authorities distinguished themselves by initiative, resourcefulness and efficiency, which bears comparison with any company. The conditions were more unfavourable in small towns and areas with scattered populations, and their backwardness was only partly due to a distrustful and obstructionist caution of the local councils.

After the turn of the century the new technique of large-scale production of electricity called for a re-adjustment of the industry, either on the basis of large public bodies or of co-operation between the existing authorities and the new power companies. Public electricity supply over large areas was practicable only if local government could be developed to provide machinery for provincial and national collectivism, as well as for parochial collectivism,⁶² if small local authorities could be induced to give up some of their power and perhaps some immediate advantage in the interest of regional and national development. Co-operation pre-supposes an attitude of give and take which was absent on either side in the municipal trading controversy. The mutual suspicion between the private and public sector of the industry is one of the main reasons for the frustration of many efforts to adapt it to the new technical conditions, which will be discussed in the next chapter.

⁶⁰ Cross Report, *loc. cit.*, p. III.

⁶¹ *Statist*, LVI (1905), p. 897.

⁶² G. Bernard Shaw, *The Common Sense of Municipal Trading*, p. 63.

CHAPTER III

LARGE-SCALE SUPPLY AND UNCO-ORDINATED EXPANSION

I. CONDITIONS OF SUCCESSFUL SUPPLY

THE structure of the electricity supply industry was suited to the technique of the early days, but science had made steady progress and in 1899 Sylvanus Thompson could state that the "methods that were in vogue at the date when the Electric Lighting Act of 1888 made electric distribution in this country commercially possible, are being superseded. Larger generating units are being used in our stations; larger areas of supply and fewer generating centres in an area are necessities of time . . . we are gradually passing to the use of large multi-polar machines coupled to larger and more economical steam engines. Ten years ago a distribution six miles from the generating station was looked upon askance by many electrical engineers. Today it is recognised that the secret of economic working is to generate on a large scale and to distribute over large areas an appropriate high voltage."¹

The most important factors in this development were probably the discovery of the practical application of the multi-phase current with the advantages arising from simpler construction and long-distance transmission,² and the invention of the steam turbine by Sir Charles Parsons, for which the first patent was obtained in 1884. The first station to use turbo-generators was the Forth Bank Power Station of the Newcastle and District Electric Light Co. Ltd. (which had Sir Charles Parsons on the Board of Directors), where two 75 kW turbo-alternators went into commission in 1890.³ In its

¹ Pres. Add., J.I.E.E., 29 (1899-1900), p. 18.

² J. F. Small, Pres. Add. to British Assoc., Section G., 1926, quoted in *Engineering*, 122, p. 194.

³ R. H. Parsons, *Early Days of the Power Station Industry*, p. 171.

most developed and latest form, the steam turbine "could get more work out of coal than can be got in any other way."⁴ These inventions increased the potential efficiency of large power stations sufficiently to provide a constant and abundant supply of electric power at a cheap price.⁵

Large generating plant has the two-fold advantage of being relatively cheaper to construct and more economical to run than small equipment. Both factors are of about equal importance, as approximately half the generating cost of a unit of electricity is due to capital charges. Until the end of the first World War at any rate, there was a noticeable trend of progress towards raising the optimum size of plant, although later on medium-size stations could rival in efficiency many so-called "super-stations."

Generation is, however, only the first step in the supply of electricity, a second and no less important factor is its transmission. The larger the station, the wider frequently the area of supply, and, therefore, the greater the cost of transmission. The early limitations which had restricted the supply from a generating station to a few miles, were soon overcome and transmission over very wide areas became technically possible; but an increased length of line necessitated heavier and more costly cable which was likely to counter-balance any saving from the use of larger plant.

The cost of transmission was also greatly influenced by the conditions and restrictions imposed by the existing legislation. Rigid rules were in force for the protection of the public, requiring the highest quality and maximum safety in conductors and switch-gear to such an extent that critics complained of the precautions being excessive and hampering growth.⁶ Overhead transmission e.g. was considered a decisive factor in the rapid development of electricity in the United States, as cables could be run more easily and more cheaply in this manner than under the highway.⁷ In England an electricity undertaking required the consent of the Board of Trade and the local authorities for an overhead system,⁸ and had no right of compulsory purchase of land for generating stations, no power to break up streets outside its area of supply.

⁴ J. H. Clapham, *Economic History of Modern Britain*, Vol. III, p. 134.

⁵ *El.*, 42 (1898-9), p. 644.

⁶ *Cf. El.*, 61 (1908), p. 20.

⁷ C. D. Taite, *Pres. Add.*, *J.I.E.E.*, 34 (1905), p. 135.

⁸ *El. Lighting Act*, 1882, Sec. 14.

The growing importance of the industry made an alleviation of these restrictions imperative, and the Parliamentary Committee examining in 1898 the position of electricity supply reported in favour of granting authorised undertakers certain compulsory powers.⁹ These recommendations were eventually adopted in the Electric Lighting Act of 1909, which enabled the Board of Trade (now the Electricity Commissioners) to grant by special order compulsory powers of land purchase and permitted undertakers to break up streets between their power station and the boundary of other areas of supply with the consent of the local authorities concerned. (1909 Act, Sec. 1-3.)

Large-scale production and transportation can only be successfully adopted for the supply of a commodity, if there is sufficient demand to warrant it. This is particularly true of electricity, which as yet cannot be economically stored. Whereas gas can be manufactured at an even rate throughout the day, any surplus over immediate demand being stored in the gasholder, electricity plant must be designed at all times to cater for the peak demand, and may be partly or completely idle for a large portion of the day. If electricity were used only for lighting, the plant would only be employed during the hours of darkness, but they could not be shut down during the day owing to the possibility of a sudden fog causing a freak demand. The aim of supply authorities is, therefore, not only to build up a big demand for electricity, but to create, as far as possible, a steady demand throughout the day and the year. The "load factor," the relation between the average demand on the plant and the maximum demand at any one time is of the utmost importance and can be improved by extending the supply over large areas and especially to different classes of consumers with demands at different times.

In the early days practically the whole demand for electricity had been for lighting purposes, so that the generating station was in operation for a comparatively small number of hours. To overcome this waste of plant and capital during the greater part of the day, supply undertakings had to develop a daylight load. Two fields of activity lay open, the supply for industrial power and for domestic use in addition to lighting.

The first opened a vista of quick and substantial progress, as the power demand of a single factory might exceed the lighting

⁹ B.P.P. (1898), IX, 213, q. 1 (Cross Report).

requirements of a whole town. The costs of installation and providing the service would be relatively small, and in the ideal case of a consumer only using power during the day, his demand would in no way conflict with the requirements of consumers for lighting.

As the average load factor of a lighting supply amounted to only 14.5 per cent.¹⁰ a steady power supply could be given at low rates ; it would substantially increase the utilisation of existing generating plant and thus reduce the capital cost per unit. There was, however, a possibility of the power demand overlapping the lighting demand at the time of highest consumption, during dull winter days. For this combined demand many stations were not large enough, with the result that undertakings could not provide for large industrial power users without costly extensions. New large stations with powers of supply over wide areas became an essential condition of success. It may be this overlapping of demands which kept down the load factor, so that even in 1926 it did not exceed 30 per cent. To compete successfully with steam, hydraulic, gas and other forms of power, large-scale production of electricity based on a large and steady demand for electric lighting was essential. The experience of power companies has shown that for power supply alone electricity was often not competitive against the other sources of power ; even with a lighting load as a background, the margin of profit was small at the beginning.

Later the development of domestic power became increasingly important, especially after the invention of the metal filament lamp had temporarily reduced the consumption of current for lighting and had opened the market to the small domestic user with a very poor load factor.¹¹ The expense of providing this service was frequently not warranted by the prospective consumption for lighting, unless it was supported by a heating and cooking load. An extremely promising market lay open, but it required commercial initiative and energy which, even as late as 1906, was found " sadly lacking in far too many places."¹²

II. THE POLITICAL DIFFICULTIES OF ADAPTATION

The progress of electricity supply in Great Britain was not spectacular and compared unfavourably with other countries,

¹⁰ E. Garcke, *The Progress of Electrical Enterprise* (1907), p. 24.

¹¹ Cf. *El.*, 61 (1908), p. 20.

¹² *El. Rev.*, 45 (1906), p. 401.

especially the United States. It was generally taken for granted that this country was backward, although statistics were shown to prove that consumption per head was higher and the cost of supply lower than, for instance, in Germany.¹³ Such general comparisons of countries overlooked the differences in the conditions, e.g. in the U.S.A., with their much larger areas, rapidly-growing populations and new industries constantly springing up, as against an old country like Britain, with old-established interests and the cheapest gas supply in the world.¹⁴ Mr. W. L. Madgen in a paper to the Institution of Electrical Engineers maintained that the disappointing position of the industry was entirely due to the silly legislation by Parliament and obstruction by local authorities,¹⁵ and the I.E.E. committee on electrical legislation passed a resolution stating that the "cause of such backwardness is largely due to conditions under which the electrical industry has been carried on in this country, and especially to the restrictive character of the legislation . . . and the power of obstruction granted to local authorities."¹⁶

The I.E.E. committee had previously heard evidence showing that the wild speculation of the early days of the industry was another important cause for the slow progress of electricity, and Col. R. E. Crompton stated that it was not in electrical engineering alone, but in all classes of mechanical engineering, and many other branches of industry not hampered by restrictive legislation, that America and Germany had commenced to beat England at about 1882.¹⁷ The President of the Board of Trade, in replying to a deputation of the Institution of Electrical Engineers, pointed out that in an old country with a very dense population, and strongly established interests, there was a very strongly developed instinct of conservatism which he considered the fundamental reason of the backwardness of electricity.¹⁸

Most probably all these factors were of importance ; legislation had stabilised the structure of the industry on the basis of small independent local undertakings which were handicapped in many

¹³ Cf. W. M. Mordey, *Pres. Add.*, *J.I.E.E.*, 42 (1908), p. 10.

¹⁴ J. A. Robertson, *J.I.E.E.*, 52 (1914), p. 33, but cf. *I.M.E.A. Proc.* (1959), p. 9.

¹⁵ Wm. L. Madgen, *J.I.E.E.*, 30 (1901), p. 479; cf. A. M. C. Swinton, *Ev. to Jt. Sel. Com. on Mun. Trading* (1900), *loc. cit.*, q. 1305.

¹⁶ Res. passed 25-3-1902, Sec. 2.

¹⁷ *Min. of Proc. I.E.E. Comm. on El. Legis.* (1901), q. 155; cf. *Mun. Trading Com.*, *loc. cit.*, q. 164.

¹⁸ *J.I.E.E.*, 31 (1902), p. 1326.

ways, and which suffered to an increasing degree from a fault which they could not remedy on their own account : their own limitation of size and power. Large-scale supply demanded wider areas, concentration of generation in a few large plants and integration of systems. How could these be achieved ?

Practically all large towns provided their own electricity on an economic basis and were not likely to benefit immediately from a wider scheme. They had civic pride in their own enterprise, and were unwilling to sacrifice any powers without a struggle. In many other areas local authorities or companies had built up more or less successful undertakings and had created a vested interest in their independence ; but the fact that only a moderate proportion of the small authorities had invested capital in generating plant, their very lack of initiative in the past encouraged the expectation that they at least would gladly accept a comprehensive scheme if it promised a cheap supply of power.

The situation was, however, complicated by the antagonism between the municipal section of the industry and the companies, which rendered any idea of co-operation extremely problematical.

It appears that great legislative skill was required to reconcile the various interests to a thorough reorganisation of the industry, but Parliament had the duty of leading the way in proposing a suitable scheme, rather than leave the matter entirely in the hands of private Bill promoters.¹⁹ The L.C.C. Bill of 1902 was defeated owing to Government objection to private legislation on such an important measure,²⁰ but another seven years elapsed before a belated Act entered the Statute Book.

Great caution appeared desirable, as legislation had been blamed for past failure ; company promoters clamoured for the removal of restrictions alleged to hamper the industry, and believed that this would be sufficient to ensure a speedy progress in power supply and traction. It is not surprising that the Government was glad to avoid the thorny problems which a constructive national scheme would have involved, and allowed the various interested groups to put forward their own proposals. Events proved that the result of pressure and counter-pressure was an unsatisfactory compromise which complicated matters without touching the root of the trouble.

¹⁹ Cf. Sir Wm. Harcourt, *Parl. Deb.*, 4th Series (1900), Vol. 79, col. 1396.

²⁰ *Loc. cit.*, V. 105, c. 22. See p. *infra*, p. 79.

III. PROPOSALS FOR CONCENTRATION

(1) *Combination of Companies*

The creation of large concerns out of a multiplicity of small units characterised industrial developments of the period and led to the growth of trusts in America, cartells in Germany, and more loosely-knit unions and syndicates in a number of British industries.²¹ In the American electric supply industry, where unrestricted competition had brought into existence a great number of small companies, a rapid process of consolidation set in²² which paved the way for the introduction of modern technique, but did not necessarily benefit the consumer. In fact, he had to pay higher prices than in England in order to provide a fair return on a capital which had been considerably "watered" in the process of consolidation.²³

In England, the supply areas of companies and local authorities were widely interspersed, and a consolidation by a combination of companies would not in many cases have resulted in compact units, but would have resembled an unfinished jig-saw puzzle. An amalgamation of companies alone would not produce the advantages of large-scale production and inter-connection to any extent, except in London, where a practically continuous belt of company areas existed. Limited co-operation of the Metropolitan companies was permitted in 1899 when four west-end undertakings were allowed to resolve into two groups and each group to connect itself with an outside generating station. Such co-operation was recommended as the obvious remedy for the special difficulties existing in London, and after the defeat of the more ambitious power schemes the London Electric Supply Acts of 1908²⁴ enabled the companies to make agreements for mutual assistance and association.²⁵ Even then outright amalgamation was not permitted.

There were two objections to combinations of this kind, one of an economic and one of a political nature. Economically, there was a danger that even if agreement could be reached between the various companies—and very often the various proposals clashed with one another—the technical unification would be exceedingly

²¹ Cf. J. H. Clapham, *loc. cit.*, Vol. III, C. IV., and J. Schumpeter, *loc. cit.*, Vol. I, p. 403.

²² Cf. *Proc. 3rd World Power Conf.*, Washington, 1936, Vol. VI, p. 248.

²³ C. D. Taite, *Pres. Add.*, J.I.E.E., 34 (1905), p. 138.

²⁴ 8 Edw. 7, ch. 167-8.

²⁵ See below, p. 86.

slow owing to the enormous diversity of systems and the tendency of such combined bodies to respect the *status quo*.²⁶ Later experience has borne out the justification of this fear.

Local authorities opposed this solution for political reasons, as they were afraid that amalgamation of companies would render their purchase rights completely ineffective. Large generating stations would be built for supplying current to a number of districts but possibly situated far away from any of them. It would thus be impossible for any local authority to take them over after a period of years. The eagerness of large supply companies to transmit their electrical energy in bulk from large generating works outside the area covered by their provisional order, was not attributed to their desire merely for better facilities,²⁷ but seemed to constitute an attempt to frustrate the purchase rights of local authorities. The Electricity Supply Bill of 1903 actually attempted to clarify the situation by extending the Purchase Clause of the 1888 Act to a generating station situated outside the local authority area it supplied, but in the absence of any large purchasing authority the clause could practically only apply to stations used solely for supplying in one district. As not a single London company station had been erected exclusively for one local government district, the clause would have been practically inoperative in London.

The problem of the purchase rights over large undertakings will be examined when the power schemes are discussed. It will suffice in this connection to draw attention to the difficulties involved. Only in the case of London was it agreed that a single controlling body was necessary, and the London Electricity Supply Acts of 1908 and 1910 transferred the purchase rights of the Metropolitan Borough Councils to the London County Council (Sec. 23). After this reform, amalgamation of companies could have safely been permitted, but another fifteen years elapsed before the 1925 Acts authorised complete concentration of company control.

The prohibition of formal amalgamation of statutory undertakings led to the growth of "holding companies," which held a controlling interest in a number of undertakings without assuming the responsibilities of statutory undertakers under the Electricity Acts. This development was inevitable as the only way of securing the unification of control over retail distribution, e.g. in power company areas,

²⁶ *El.*, 47 (1901), p. 815; *Statist.*, LX (1907), p. 540.

²⁷ *El.*, 47 (1901), p. 279.

but it opened the door to abuses which the legislation had endeavoured to prevent. Holding companies were entirely free from public control and regulation and, whilst the McGowan Committee²⁸ was satisfied that most of the companies had operated efficiently and had done good work in extending facilities for the use of electricity in the areas they controlled, the holding company structure contained in their view possibilities of excessive charges and other abuses.

(2) *Power Companies*

Even in London, the legislation permitting the association of existing supply companies was accepted only as a compromise after more far-reaching schemes had foundered on the opposition of the existing authorities. All over the country enterprising engineers and financiers had conceived ambitious plans for bringing the electricity supply industry up to date, beyond the scope of the existing Electric Lighting Acts. They estimated that the capital required for electrical development during the next ten years would amount to £250,000,000, and claimed that only private capital could undertake an enterprise of this magnitude, otherwise it would have the effect of diverting the attention of local authorities from the social and sanitary problems which should be the first object of their solicitude.²⁹ This anxiety for the finances of local authorities was shared to a certain extent by municipal finance committees, e.g. the L.C.C. Committee, which, in a report on the Council's Power Scheme of 1905, viewed with apprehension the large addition to the Council's capital commitments which the undertaking (of approximately £3,000,000) would necessarily involve.³⁰ The ambitious development plans found expression in the various power company schemes, proposing the erection of large central stations with powers to compete with the existing local suppliers.

(a) *The Power Company Schemes*

The first Power Company Bill was put forward in 1898 by a syndicate of large manufacturers of the Chesterfield district associated in the "General Power Distribution Company," which proposed to lay down a central station to supply current to consumers

²⁸ M.O.T. *Report of Com. on El. Distribution* (1936), par 282 ff.

²⁹ R. P. Sellon, Address to London Chamber of Commerce, quoted *El. Rev.*, 50 (1902), p. 36.

³⁰ Rep. of Finance Committee to L.C.C., quoted *El.*, 56 (1905-6), p. 18.

in an area of 210 square miles with 1,000,000 inhabitants. Of this area only 66 square miles were already allotted to an authority by licence or provisional order, and actual supply was available only in an area of 4.5 square miles with 1,546 consumers.³¹ In the original Bill the promoters proposed to compete with any existing or future authorised undertakers in the hope that the economic superiority of large-scale supply would eventually force all other supply undertakers out of business.

Against this threat to existing undertakings, towns like Sheffield and Nottingham raised a strong protest, with the result that they were excluded from the area of the Bill. In the House of Lords Committee, the promoters offered a clause providing for the exemption of local authorities from competition in retail distribution (i.e. consumption of less than 10,000 units per annum) if they were prepared to take bulk supply from the company.

If this Bill had passed through Parliament, similar Bills would have been proposed for the whole of the United Kingdom, and the value of the 200 provisional orders held by local authorities would thereby have been seriously reduced.³² Mr. Balfour Browne, an expert on public utility legislation, considered the Bill a backward step in introducing competition, whether the local authority was in default or not, as competition had been tried in relation to gas and water, and after trial and failure had been abandoned.³³

As it was late in the Parliamentary Session, the Bill was suspended and, when brought up again in 1899, a Conference of Municipal Corporations resolved to oppose the Bill on general grounds. The President of the Board of Trade declared that the principle of the Bill seemed to be a direct attack on the rights and duties of municipalities and practically set aside the existing law. Any private Bill of that kind ought to be rejected. When the promoters agreed to certain far-reaching concessions, he recommended a second reading in the interest of the progress of the industry.³⁴ In spite of this, the Bill was rejected on second reading as "a most perilous innovation prejudicial to the privileges of the great municipalities."

Meanwhile a Joint Select Committee of the House of Lords and House of Commons had been formed under the chairmanship of

³¹ *Parl. Deb.*, 4th Series (1899), Vol. 67, c. 1192.

³² *El. Rev.* 43 (1898), p. 77.

³³ *El. Rev.*, 44 (1899), p. 38.

³⁴ *Parl. Deb.*, 4th Series, c. 1197 ff.

Lord Cross to consider the new situation and to report whether power should be given for the supply of electrical energy over an area including districts of numerous local authorities.³⁵ The Committee reported that, where sufficient advantage was shown, power might be given for the supply of electrical energy over a wide area including a number of local authorities and involving plant of exceptional dimensions and high voltages, on conditions differing in some aspects from those imposed by and under the existing Acts.³⁶

Although no general Act was passed for many years to implement the recommendations of this Committee, they formed the basis for the many Power Company Bills which were passed by Parliament. In 1900, five private Bills came up authorising large-scale supply of electricity in the industrial centres of the country. The Bills, with the exception of one, all passed into Acts in a modified form, and formed the pattern for similar Acts during the next few years. The proposals, based on the recommendations of the Cross Report, purported to keep the number of power stations within economical limits and to reduce the cost of generation and transmission by the selection of suitable sites—if possible at pitheads,³⁷ and in places where coal was cheap and ample supply of water was available—and to equip works of considerable magnitude.³⁸

(b) *Bulk Supply*

The threat of direct competition with municipal electricity undertakers had been the main cause leading to the defeat of the General Power Distribution Bill in 1899, and no later Bill had any chance of success which did not respect the vested interests of local authorities, in spite of the fact that the Cross Committee had strongly opposed the granting of powers of veto to local authorities. Promoters, therefore, were content to ask for the right of giving bulk supply to existing undertakers, or at least to those willing and prepared to take it, and refrained from demanding any compulsory powers.

It was most improbable that the efficient and economical undertakings of large towns should find it advantageous to take a supply

³⁵ Rep. of Jt. Sel. Com. on Electricity Generating Stations and Supply, B.P.P. (1898), IX, No. 213.

³⁶ *Ibid.*, q. 4, 5.

³⁷ Suggested by Mr. Swinburne, *Evo. to Cross Committee*, q. 883.

³⁸ Wm. L. Madgen, *Electric Power Bills of 1900*, J.I.E.E., 30 (1901), p. 488.

from power companies, but the backward and practically undeveloped small towns were obviously a promising field. Small local authorities, rather than build up uneconomic stations themselves³⁹ or extend existing small size plant, could take a supply from the power companies, and thus benefit from large-scale production. Responsible municipal engineers at the Conferences of the Incorporated Municipal Electrical Association (I.M.E.A.) agreed that the bulk supply to small towns was an obvious sphere of utility of power companies,⁴⁰ but many local authorities would not believe that the success of large municipal undertakings was no guarantee for similar success of small-scale enterprise⁴¹; they were reluctant to sacrifice a potential source of revenue and refused to become dependent on companies.

With the exception of certain areas, such as Durham, where the local authorities actually supported the Power Bill, bulk supply made rather slow progress,⁴² only gradually the suspicion towards power companies diminished and a better feeling developed. The number of bulk supply agreements was, however, growing, encouraged, no doubt, by the increasing difficulties of raising money for small generating stations placed in the way of local authorities by the City and the Local Government Board.⁴³

(c) *Power Supply*

The supply of electricity in bulk to existing distributors did not necessarily benefit the ultimate consumer directly and immediately, as lower cost did not always mean a reduction in charges. The promoters of the new Bills asked, therefore, for the right to assist British industry in their competitive struggle by providing power directly to factories and other large consumers, and pointed out that this was a field hardly tapped by the existing suppliers of electricity. The promoters of these schemes gave two main reasons why they should be so empowered to supply individual users, namely that there was a fundamental difference between electricity for lighting and for power, and that existing undertakers were not in a position to carry out this more modern application of electricity.

³⁹ H. A. Earle, *J.I.E.E.*, 31 (1902), p. 885.

⁴⁰ Cf. *Proc. I.M.E.A.* (1903), p. 73; (1904), p. 9; (1905), p. 94.

⁴¹ G. Pearson, *Proc. I.M.E.A.* (1903), p. 73.

⁴² *El.*, 46 (1900-1), p. 17.

⁴³ T. H. Minshall, *The Times Eng. Supp.* (1907), p. 218.

The most convenient supply for lighting was originally direct current which was unsuited for power purposes and Major Marindin's decision in 1889 to allow competing a.c. and d.c. companies in London⁴⁴ appeared to substantiate the promoters' claims. The increasing popularity of the a.c. system amongst engineers led to the replacement of d.c. plant even for lighting; authorities like Dr. Hopkinson denied that there was such a difference in a technical sense and expressed the opinion that there would be great loss from the duplication of services if separate undertakings were engaged in the supply of electricity for light and power. A district should be supplied by a single authority.⁴⁵ The representative of British Power Companies, at the World Power Conference, 1936, considered this separation a fundamental error. He stated that the "unsatisfactory duality of organisation in some areas by an overlapping of powers has involved great extra cost and delay."⁴⁶

Economically speaking, there is a difference between electric power and electric lighting, owing to the particular conditions of supply. The demand for lighting is generally inelastic and restricted to a few hours of the day, and can be satisfied by small, high-price undertakings. Electric power is only adopted if it is as cheap as any other source of power, and is, therefore, more severely regulated by competition. Consequently, an undertaking solely engaged on power supply would not have to be subject to public control of prices,⁴⁷ indeed, it would be a highly speculative enterprise likely to make losses rather than profits for a considerable period. The power company promoters contended that such business was beyond the scope of municipal trading⁴⁸ and that, in any case, the existing local undertakers were not equipped to supply current in the necessary large quantities and at a low enough price.

The local undertakers on the other hand claimed that power supply was vital for the future success of their undertakings, that it was the "cream" of electricity supply and that the Power Bills were trying to pick "the plums" from among the consumers, leaving the existing authorities the task of supplying the less profit-

⁴⁴ Cf. *supra*, p. 20.

⁴⁵ *Ev. to Cross Committee, loc. cit.*, q. 1676-9.

⁴⁶ W. B. Woodhouse, *Proc. 3rd World Power Conference* (1936), Vol. V, p. 156.

⁴⁷ *Statist*, 33, (1905) p. 1163.

⁴⁸ Cf. *Statist*, 37 (1906), p. 751.

able small customers.⁴⁹ They further feared that they would all be squeezed out from generating current themselves and become dependent on the power companies who might later on raise the prices to the maximum permissible under the Acts.⁵⁰

It would be unfair to the power companies to conclude from their statements that they did not appreciate the close interdependence of the two sides of electricity supply ; on the contrary, their ambition was from the beginning to generate current for all purposes, but to transmit a proportion of the load to the existing undertakers for retail distribution. Only the political opposition to any compulsory power of bulk supply led them to stress the power supply aspect. Neither the existing local undertakers nor power companies restricted to industrial demand without the background of a developed lighting demand could be regarded as suitable for a speedy development of electricity.

A comprehensive reorganisation of the electricity industry could have provided a single body for the supply of lighting and power, and such an undertaking would not have been beyond the scope of public enterprise, even though power supply could not be called a general necessity of life. In the absence of any comprehensive scheme, Parliament was faced with private Bills in which new claims conflicted with existing rights and a compromise had to be found.

We have noted before the Parliamentary rule that privileges granted by Act of Parliament should not be interfered with by authorising competing powers so long as the service was satisfactory, and this principle guided the Parliamentary Committees examining the Power Bills. One Committee, under the chairmanship of Sir J. Kitson, expressed the opinion that "it was of public advantage to facilitate measures which may ensure a general supply of electric power to all consumers,"⁵¹ and the power companies were, therefore, authorised to supply without restriction for power purposes in those areas where no authorised undertaker existed. In districts where local authorities or companies had obtained provisional orders, their privileges were to be safeguarded, and their consent was required before a power company could commence

⁴⁹ *El.*, 45 (1900), p. 95 ; *Mun. J.* (1904), p. 322.

⁵⁰ *Ev.* submitted to Camperdown Committee on London Power Schemes, 1905, quoted *El.*, 54, p. 973.

⁵¹ Quoted *El.*, 45 (1900), p. 187.

supply. If this consent was refused and the local undertaking was not prepared to provide the requisite supply itself on reasonable terms and within a reasonable time, then the Board of Trade should be entitled to over-ride its refusal.⁵² Unless the power company obtained provisional orders in addition to its Power Act, it was not protected against any local authority or company obtaining local supply rights for a part of the power company area, with the option of taking over the supply in its district from the power company on terms laid down by the order.

Under the ruling conditions, this appeared as a fair solution protecting the existing undertakings, so long as they gave adequate service to industry. Direct competition would undoubtedly have given an advantage to the power companies, which were free from many restrictions imposed on other undertakings and had secured a permanent tenure.

The distinction between lighting and power was really one of industrial and domestic electricity, and accordingly the power companies were authorised to supply electricity for lighting to power consumers as long as the lighting consumption did not exceed the amount of power used,⁵³ but in some Acts the lighting consumption was not permitted to be more than 20 per cent. of the total.⁵⁴ The power companies were further granted the right of supply without the consent of the local distribution authority to certain very large consumers, such as railways, docks and tramways. These concessions, incorporated in the so-called "Kitson Clause," were inserted in most power company Bills, and improved their chances of success, although the complicated procedure they entailed was by no means helpful to the companies in convincing conservative industrialists of the advantage of electricity.

(d) *Municipal Opposition*

It will be noted that power companies had very little opportunity of directly encroaching upon the preserves of local authority undertakings. In spite of this, large towns made great efforts to be entirely excluded from the area of power companies. Liverpool, Manchester and Stockport, for instance, even objected to the only

⁵² *El.*, 45 (1900), p. 411; cf. *Cleveland and Durham County Electric Power Act*, 1901, cl. 54 (4).

⁵³ See *Somerset and District Electric Power Act*, 1903, cl. 50.

⁵⁴ *Administrative C. of L. & D. Bill*, 1905, quoted *El.*, 54, p. 930.

right claimed by power companies, to open up the streets within the corporation boundaries, with the result that the companies had to lay their mains by more circuitous routes. The officials of large towns, although confident that "a power company has nothing to offer in the best interests of the consumer,"⁵⁵ wanted to preclude companies from entering their towns under any pretext at any time.

The exclusion from the power company areas of large centres which should have been the nuclei of a well-conducted development policy did not in itself "minimise or annul the chance of financial success" of these companies (as *The Times* maintained)⁵⁶, as even without it municipalities could not have been forced to take bulk supply from the companies. It only accentuated their precarious position, as success or failure depended to a very large extent on the goodwill and co-operation of the existing authorities, especially the municipalities.

We have already referred to the distrust between the public and private sector of the electricity industry and to the attempts made by company promoters to depreciate municipal enterprise in the eyes of the public. The Power Bills were suspected as instruments for the destruction of municipal trading, and were looked upon as attempts to bring electric supply under the control of a "gigantic private monopoly."⁵⁷ The fact that the Bills did not ask for any exclusive powers did not preclude the possibility of companies acquiring a virtual strangle-hold over the industry. Mr. John Burns, M.P. for Battersea and staunch supporter of municipal rights, quoted the experience with the London water companies, which, in spite of the insistence on competition between them, entered into a "tacit understanding to secure by force of capital what is practically a monopoly."⁵⁸

Opposition to "monopolistic greed" was, however, frequently a good excuse for parochial obstructionism. Mr. Bernard Shaw strongly condemned this attitude and explained the lack of popular support for the power companies by the fact that the grievance of being hampered in their development of whole provinces was the grievance of millionaires or trusts of millionaires, generally assumed to be American. "The hostility of the average municipal councillor

⁵⁵ G. Pearson, *Proc. I.M.E.A.* (1903), p. 73.

⁵⁶ *The Times*, 1-6-1901.

⁵⁷ *Mun. J.* (1900), p. 142.

⁵⁸ *Parl. Deb.*, 4th Series (1899), Vol. 67, c. 1203.

to this combination, though it is a particularly unenlightened one, reflects that of the public ratepayer."⁵⁹ The only sensible alternative to power companies was, in his opinion, the extension of the system of local government service on a regional or even national scale.

The fears of local authorities and other exponents of public ownership that British electricity supply might fall under the control of a widespread electrical trust were not, perhaps, completely unfounded. An idea of the ambition of some financial groups can be gained from the range of interests of the Electric Power Distribution Co. Ltd., which was formed in 1898 by Messrs. Raworth, Garcke, Sellon, Madgen and others. The company held provisional orders in places as far apart as Barnet, Durham, Gateshead, Hertford, Lewes, Sutton, Weston-super-Mare, Banbury, Jarrow and Staines; it promoted and controlled the County of Durham and North Metropolitan Electric Power Companies, and Mr. Sellon was also one of the directors of the Lancashire Electric Power Company. The company was further closely allied to and was, in 1902, absorbed by the British Electric Traction Co. Ltd., which controlled a great number of tramway and light railway undertakings in Great Britain, of which Mr. Garcke was managing director and Mr. Raworth technical director. The latter company, in turn, had large financial interests in the British Electrical Engineering Co., and some directors were on the board of the County of London and Brush Provincial Electric Lighting Company.⁶⁰

It is, therefore, not surprising that local authorities did not consider power schemes entirely on their technical merits alone, and that the associations of local authorities as a whole took such a strong and hostile interest in the Bills.

(e) *The Grant of Permanent Concessions*

The possibility of the growth of monopolies was felt to be a real danger, and it was generally appreciated that there must be suitable public control of power companies without crippling their ability to provide a cheap and abundant supply of electric power. Under the existing Electric Lighting Acts, the protection of the public consisted fundamentally in the purchase right of local authorities, enabling them to buy that part of a company owned electricity

⁵⁹ G. B. Shaw, *Common Sense of Mun. Trading* (1908), p. 63-4.

⁶⁰ Cf. *Garcke's Manual of Electrical Undertakings*, Vols. V-IX.

undertaking situated within their district. The Cross Committee came to the conclusion that this provision of the 1882 Act was inapplicable as a general rule to the case of undertakers supplying energy in bulk at high voltage.⁶¹

The existing small local authorities were obviously unable individually to carry on the undertaking of a power company without defeating its very purpose. If a large-scale undertaking was eventually torn up into small parts, the local authorities would obtain possession of useless fragments, such as main transmission lines without generating plant or excessively large stations. Compulsory purchase was only practicable, if a public body covering a wide area was authorised to take over electricity supply. Sir Courtenay Boyle, the permanent Secretary of the Board of Trade, pointed out that companies supplying current in bulk ought to be subject to purchase by some authority not yet determined, and actually suggested that County Councils would be suitable bodies.⁶² Unfortunately, County Councils, as will be seen presently, were generally unable and unwilling to undertake such responsibility, with the exception of the active and ambitious L.C.C. It is noteworthy that all London Power Bills of the period, beginning with the Administrative County of London and District Electric Power Bill of 1905, provided for eventual purchase by the L.C.C. or some authority established for this purpose,⁶³ and that the Acts of 1908 and 1910 confirmed this suggestion.

In view of the national importance of electricity and electricity control it was sometimes suggested that the central government should be made the purchasing authority or at least that *ad hoc* bodies should be created for the purpose, but this idea was regarded as too revolutionary for serious consideration.⁶⁴

No single existing government body was a really satisfactory purchasing agency and the Cross Committee seriously discussed the possibility of empowering a combination of local authorities for this purpose, nearly half the members of the Committee actually favouring this proposal.⁶⁵ The prospect of a number of councils jointly managing a highly complicated and technical undertaking

⁶¹ *Cross Report, loc. cit.*, p. 111.

⁶² *Ev. to Cross Committee*, q. 2066.

⁶³ See below, pp. 72 ff.

⁶⁴ See Swinburne, *Ev. to Cross Committee*, q. 1108; W. Ivey, *Min. of Proc. of I.E.E. Committee on Electrical Legislation* (1901), p. 74.

⁶⁵ *Parl. Deb. 4th Series* (1899), Vol. 67, c. 1188.

apparently did not find the approval of a majority of the Committee, influenced perhaps by the complaint of some witnesses that the purchase rights constituted an unbearable burden on public utility enterprises, hampering their development. The Cross Report recommended the granting of permanent concessions to power companies, although there might be special cases where it was desirable that the local authority should have the right to purchase reserved. The Board of Trade should have power to insert the purchase clause in the provisional order, if the local authorities concerned could, in the opinion of the Board, show good cause for such a course.⁶⁶

This recommendation marked a complete departure from the principle of public control of electricity supply incorporated in the 1882 and 1888 Acts. The underlying consideration was possibly that bulk supply and power supply would be permanently regulated by competition and should, therefore, be left to private enterprise, especially in view of their speculative nature. There was at that time no conception of the national importance of a co-ordinated and inter-related electricity supply, the problem was simply that small isolated local undertakings were to be made more efficient by superimposing haphazard independent bulk supply companies. Parliament did not realise the importance of this step and was satisfied to accept Private Bill Legislation for establishing power companies.

The municipalities for their part were content with inserting restrictions and limitations to safeguard their own individual independence. They were not disinterested and far-seeing enough to insist on the reservation of purchase rights for a regional authority that might be formed in the future, and in the absence of any real counterpressure, the power companies gained a concession which greatly complicated later attempts at reorganisation of the industry.

It is true that already the first Supply of Electricity Bill of 1903, generally based on the recommendations of the Cross Report, empowered the Board of Trade to constitute joint committees or boards for the joint exercise of the purchase power (Sec. 5) and provided only for the exclusion of the purchase clause in certain cases. In later Bills the exceptions gradually disappeared altogether, but permanent concessions had meanwhile been granted by private Power Company Acts.

⁶⁶ *Cross Rep., loc. cit.*, p. III.

(f) *Price Control by Sliding-scale*

Public control of an industry can be devised for the protection of the consumer against exploitation ; it can also have a positive function of directing development on lines different from those which would result from a policy of maximising profits. There would, therefore, still be a case for public enterprise, even if the charges to the consumer under public control were no less and possibly even higher than under company management.

Whilst this latter consideration was implicit in the arguments of the municipal Socialists, there were other sections of opinion concerned with the danger of exploitation by utility companies. They feared that power companies might persuade local authorities and other distributors to take bulk supply of electricity, by charging less than the cost of independent generation, but that they would raise their tariffs once the undertakings were entirely dependent on them. Water and gas companies had been subjected to a sliding-scale of profits and dividends, and the application of some such system of price control (which had been recommended for the electricity industry as early as 1886) appeared to be imperative.⁶⁷

The sliding-scale is a method of control which encourages efficiency by allowing increased dividends, if prices to consumers are reduced below a "standard" figure. Thus a dividend of 8 per cent. was frequently permitted if the charges were equal to a standard price of 2½d. per unit, and for every 1¼ per cent. by which the average price per unit obtained by the company throughout the area in any year was less than this standard price, the dividend could be increased by 5s. per cent. and vice versa.⁶⁸ The effectiveness of such a scale for safeguarding the consumer depends entirely upon the possibility of fixing a fair standard price and dividend. The Board of Trade, as we have seen, had been doubtful during the 1880's as to whether its experience with electricity would enable it to make an adequate estimate of costs⁶⁹ and the difficulties had been increased rather than diminished by the development of electricity supply into a source of power as well as of light. The concept of average cost had lost its meaning, as the cost of a unit during a slack period may be negligible, whereas during "peak hours" it may rise to a figure far in excess of any maximum price.

⁶⁷ *Ibid.*, q. 1154.

⁶⁸ *Will's Law relating to Electricity Supply* (1932), p. 49.

⁶⁹ *Cf. supra*, p. 13.

However, with suitable provisions for a frequent revision of the scale, the sliding-scale could be considered as a satisfactory rough method of price control and was accordingly recommended by the Cross Committee, whenever the Purchase Clause was dispensed with in a power scheme. The Board of Trade should have the power to alter the scale after five years upon petition by the company, a local authority, or 20 consumers.

In view of the backward state of the electricity supply industry and the urgency of a speedy development, the Power Acts also usually included a provision stipulating that the companies must commence with the work within two years and erect a station within four years, otherwise the powers could be revoked by the Board of Trade, a threat which, in view of the circumstances, could not prove very effective.

(g) *The Failure of the Power Companies*

The hopes of a rapid electrification of the country by the power companies were not fulfilled and the optimistic anticipations of engineers and investors were again disappointed. "The financial possibilities of power supply were in many cases over-estimated to such an extent that it was believed that almost any Power Act, no matter how many restrictions it contained, could be made to pay."⁷⁰ Local authorities looked upon Power Bills as goldmines, and insisted on inserting many restrictions⁷¹ which promoters did not consider as deterrents until the failure of many companies became apparent. Then the weaknesses of the Acts were blamed as the main cause of their misfortunes.⁷²

Of the 20 leading power companies incorporated by 1907 with an authorised share and loan capital of £21,000,000 some £3,770,000 only had been raised, of which over £1½ million were accounted for by the three N.E. Coast Companies, the only ones to pay any dividend.⁷³ The failure of the South Wales Electric Power Company, where considerable mismanagement and disappointing development of power supply led to a loss of £8 million,⁷⁴ strengthened the disinclination of promoters and investors alike to deal with this class of business.⁷⁵

⁷⁰ T. H. Minshall, *The Times Eng. Supp.* (1907), p. 202.

⁷¹ *Statist.*, 59 (1907), p. 1156.

⁷² *El. Rev.*, 60 (1907), p. 719.

⁷³ T. H. Minshall, *loc. cit.*, p. 18.

⁷⁴ *El.*, 58 (1906-7), pp. 478, 509.

⁷⁵ Cf. J. M. Donaldson, *Pres. Add.*, *J.I.E.E.*, 70 (1931-2), p. 5.

It is, however, doubtful whether this attitude was due to the realisation that the Power Acts were an unsatisfactory method of reorganising the electricity industry. It was more the result of a general investment trend which had little interest in British industry. The great London issuing houses concentrated on foreign, in particular Colonial, enterprise, and practically abstained from the financing of domestic industries.⁷⁶ "The investing community was over-investing a little abroad, and under-investing a little at home."⁷⁷ The prosperity period in which the big power schemes had been devised, came to an end in 1900, and in the years of slow trade and hesitating company promotion following the South African War, grandiose schemes were out of fashion.⁷⁸ The depression of 1903 was characterised by heavy unemployment, especially in engineering.⁷⁹ Business improved in 1904, but only well within the last quarter of 1905 were trade brisker and prospects brighter.⁸⁰ A period of prosperity set in in 1906, which soon ended in the crash of 1907. Conditions were obviously not very favourable for a rapid development of electricity, when industry in general was stagnant and commercial interest turned to foreign ventures. In addition, the old causes of backwardness remained, namely the conservatism of the majority of power users, the low cost of alternative sources of power, especially the cheapness of coal,⁸¹ and the fact that in many industries, such as the textile, a considerable amount of steam was required for process work.

The only power company which was an early and thorough success was the Newcastle-on-Tyne Electric Supply Company, whose exceptional progress was due to a number of favourable factors. It started as a distributing company in 1889 and acquired distribution rights for the major part of its area. Thus there existed the nucleus of a substantial lighting demand which was sadly missing in most power company areas. Other factors were the concentrated nature of the industrial area of the Tyneside, the enterprise of engineers, the enthusiasm of capitalists to embark on a progressive development policy and comparative freedom from

⁷⁶ J. Schumpeter, *Business Cycles*, I (1939), p. 429.

⁷⁷ J. H. Clapham, *Economic History of Modern Britain*, Vol. 3, p. 52.

⁷⁸ *Ibid.*, p. 301.

⁷⁹ *Ibid.*, p. 42.

⁸⁰ *El. Rev.*, 50 (1906), p. 121.

⁸¹ Cf. T. Roles, *Chairman's Address*, *J.I.E.E.*, 68 (1930), p. 56.

municipal opposition.⁸² Between 1899 and 1905 the current sold rose from 967,000 units to 30,379,000, the cost of production fell from 2d. to .52d. and revenue from 4.12d. to 1.03d. per unit,⁸³—remarkable progress within a few years. During the ten years from 1903-13 consumption rose by 3,200 per cent., compared with an average of 435 per cent. for the whole country.⁸⁴ The group of men who had financed the Newcastle undertaking proposed also a power company for London, and their chief engineer, Mr. Merz, prepared in 1905 the first of his many schemes for bringing the electricity supply in the Metropolis up to date. The Administrative County of London and District Electric Supply Bill of that year provided for bulk supply to existing authorities, and direct power supply in the industrial area of East London. The Bill, after nearly passing in 1905, was defeated by the common opposition of companies, boroughs and the L.C.C.⁸⁵

The greater prosperity of 1906-7 stimulated the supply industry and a number of power companies emerged into the fortunate position of dividend-earning concerns.

As previously mentioned, the co-operation between municipalities and private undertakers was growing, and small local authorities were adopting to an increasing extent, bulk supply from power companies. The connection of these companies increased from 40,778 kW in 1904 to 86,115 kW in 1906, and 158,780 kW in 1908, but the figures reflect the addition of a few large consumers rather than that extensive network of electricity supply over the whole country, which was so desirable.

The disappointing development of the power companies, their failure to solve the problem of electricity supply in Great Britain must, therefore, be attributed to a combination of facts. The engineers responsible for the schemes were undoubtedly sound in their ideas and men of vision, but they under-estimated the strength of opposition from vested interests, and when faced with their antagonism, were optimistic enough to make concessions which seriously impaired the chance of financial success. Domestic trade depression reinforced the existing conservatism of industrialists and prevented the adoption of electricity for power on a large scale,

⁸² E. Garcke, *The Progress of Electrical Enterprise* (1907), p. 33.

⁸³ *Ibid.*, p. 35.

⁸⁴ C. Vernier, *J.I.E.E.*, 52 (1914), pp. 17 ff.

⁸⁵ See pp. 75 ff.

whilst, in view of excellent investment opportunities abroad, little capital was available for undertakings which could not guarantee a quick return.

It was, however, inherent in the very idea of power companies that no quick return could be forthcoming. Large-scale development with large plant necessarily involved—even under the most favourable conditions—the existence of unused capacity for a considerable time and, if prices were kept low enough to attract power consumers and existing small supply undertakers, losses had to be faced. It was unlikely that tariffs could be made sufficiently attractive to secure the bulk supply for large towns, and the exclusion of some municipalities from the power company territory only put the seal on a well-known fact. Owing to the absence of definite contracts and the shortage of capital, small generating stations were frequently installed, with the result that the costs were no less than those of the stations which the power company wanted to supersede. Some undertakings were over-cautious and never attempted to capture the important industrial load.

Even if there had not been such a concurrence of unfavourable conditions, even if the companies had secured full powers of competition, they would not have led to the most satisfactory development of electricity. A thorough and comprehensive electrification of the country could only succeed if the authority responsible could build upon a large and steady load as a basis, such as only large towns provided. Close co-operation with large municipal bodies from the beginning was an essential condition of success, otherwise the risk of putting down large generating plant was too great.

(3) *Municipal Schemes*

Prior to the Power Bills, electricity supply was increasingly becoming a municipal service, and the desire that it should remain so was one of the main reasons for the opposition to power companies.

It was, however, realised that the threatened competition from companies could not be effectively met by a merely negative opposition, and that, in the absence of counter-schemes for the reorganisation of the industry on a public basis, the companies might be entrusted with electricity development.⁸⁸ In fact, power

⁸⁸ *Mun. Journal* (1904), p. 452.

companies, although with certain restrictions, were allowed to cover practically the whole of industrial Britain, except the Metropolitan area. Even here the Power Bill of 1905 was all but passed, and was only defeated during the next Session because the L.C.C. had prepared a comprehensive municipal scheme of its own.

Municipal management of electricity supply was characterised by high efficiency in large towns and lack of initiative among some small local authorities. Of the schemes of reorganisation conceivable with existing bodies, an extension of the functions of the large urban undertakings was, therefore, the most promising, whereas the idea of joint action of local authorities was likely to raise difficulties similar to those of company combinations.

(a) Extension from Urban Centres

The large towns were not only efficient and full of drive, they were also the ideal nucleus for large-scale schemes from a technical point of view. The foundation of a considerable lighting load gave wide scope for economic power supply and for extensions of services to outlying districts, even though they might not be immediately remunerative.

Such an extension of supply to outlying districts is in many instances likely to be the most economical method of supply, so far as the outlying areas are concerned. The increased load may also lead to a fuller utilisation of the plant, and will, therefore, be in many cases advantageous to the central undertaking.

Even if the outside districts at the beginning can only afford to pay the marginal cost of supply, i.e. the extra cost incurred by the provision of the additional supply, the central authority will not suffer and may, in fact, be encouraged to put down more economic plant of higher capacity. If sooner or later the outer districts can contribute a share of the capital costs, the financial position of the central station will be improved and will benefit all consumers.

The function of large central stations would be either to give bulk supply to small distributing authorities or to undertake transmission and retail distribution in undeveloped areas. In resolutions, the Councils of Manchester, Liverpool and other leading towns proposed such supply from large urban centres as an alternative to the granting of Power Acts.⁸⁷ Opponents of municipal enterprise concentrated their attack against such schemes

⁸⁷ *Ibid.*

which "made the local authority a trading company outside its own district,"⁸⁸ so that the ratepayer was speculating in a district in which he was not interested.⁸⁹ In an article in *The Times*, this question was discussed in detail with reference to municipal tramway undertakings, and the possible consequences were examined.⁹⁰ "It is not proper to allow a corporation to run at a loss to its ratepayers a business concern which is of benefit chiefly to people who are not ratepayers. It seems equally wrong that they should profit by it." In the absence of any over-riding considerations which would make a financial loss still justifiable to the community, these two conditions may, and have been, accepted by municipal circles.⁹¹ Parliament, in the case of the Aberdeen Corporation (Tramways) Act, 1898, inserted a clause to prevent a loss and to earmark any surplus for the benefit of the tramway, but no English Tramway Act introduced any similar condition.

The writer of *The Times* article, however, was not satisfied, and claimed that where there was no profit or loss the enterprise became "a more or less philanthropic institution for the benefit of the users of the tramways and, however good philanthropy may be in itself, it was certainly a debatable point how far a corporation was justified in going beyond its boundaries for the exercise of this, when to do so meant the monopolising of what is certainly a lawful field for private enterprise."

The supply of electricity to outlying areas by municipalities can be justified economically as an activity subsidiary to the local production and distribution of electricity, at any rate as long as it benefits both parties concerned. It would even appear that if the development involves a financial loss to the central authority, it may, under certain conditions, be to its advantage, for instance, for town-planning purposes. Planned suburban growth often means considerable saving in many municipal services which may more than compensate for any initial losses in the provision of electricity and traction.

Extension of electric services outside the local government boundary was accordingly widely adopted by large towns, and private Bills were regularly introduced and passed in Parliament

⁸⁸ Sir Courtney Boyle, *Ev. to Mun. Trading Com.*, *loc. cit.*, q. 76.

⁸⁹ Mr. Morse, *ibid.*, q. 903.

⁹⁰ *The Times*, 1-6-1901.

⁹¹ Cf. *Traction and Transmission*, Vol. 1 (1901), p. 248.

empowering municipalities to give such supplies. It was a satisfactory move towards larger areas of supply, but its application and usefulness were limited. The municipality necessarily considered primarily its own interest and proceeded to create suburbs rather than foster a truly rural development. Col. Crompton called the tendency to exalt the towns at the expense of the country one of his strongest objections to municipal trading,⁹² and it must be doubted whether an organic development of electricity in Great Britain could have been based on the outward growth from large towns alone.

(b) Voluntary Joint Action of Local Bodies

The simplest answer to power companies would have been the co-ordination of local bodies, which was hailed as the proper method by the Association of Urban District Councils. The *Municipal Journal* approved of the combination of private companies if public bodies were placed on an equal footing, enabling combinations of municipalities to distribute electricity over large areas.

In 1901 the first Bill for joint municipal electricity supply passed through Parliament, the Stalybridge Hyde Mossley and Dukinfield Tramways and Electricity Board Act creating a body of 24 representatives of the four interested towns. The Board was to carry out the retail supply of electricity as under a provisional order, profits were to be mainly used for reserve, renewal and sinking funds, but any surplus after this was to be distributed in equal shares amongst the four boroughs. Previously a similar Board had been recommended for Plymouth, Devonport and Stonehouse, but later schemes did not go as far and only provided for the bulk supply of one authority to another, such as the Bills introduced in 1906 by the Boroughs of Stepney, Hackney and Shoreditch.

The objections to the idea of joint municipal action were twofold :

(a) the antagonism of private interests to any extension of municipal enterprise on the ground that the generation of electric power on an enormous scale was bound to remain for many years to come an undertaking of a highly speculative nature, 'and would be better managed by a company than by a caucus of petty local authorities'⁹³; the experience with power company schemes was later adduced as a proof of the risky nature of large-scale supply,

⁹² *Min. of Proc. of I.E.E. Com. on Electrical Legislation*, p. 109.

⁹³ *El.*, 42 (1898-9), p. 321; *El.*, 46 (1900-1), p. 663.

but their lack of success was at least partly due to the restrictions imposed by the Power Acts, and might have been absent from a solution based on the joint co-operation of local authorities.

(b) The other and more important objection was born of the fear that joint municipal committees would be rarely formed, and even more rarely worked satisfactorily, owing to the inherent difficulties. "It is only likely to be adopted in very few cases. . . . when the districts represented on the committees would be equally benefited by co-operation. Local jealousy would come into play, especially in relation to profits, and this would be a barrier to joint action. It is hopeless to expect an effective linking-up of areas except by legislation which will not make allowance for purely parochial considerations."⁹⁴ "Local authorities have shown no disposition to combine on a large scale, engrossed with their own rights to erect petty local systems."⁹⁵

Many local authorities, no doubt, appreciated that the changed technical conditions called for an adaptation of the existing organisation of the industry. In London, where the multiplicity of undertakings was widely criticised and where the Acts of 1908 made association of undertakings possible without further Parliamentary procedure, a consultative committee was formed for the discussion of linking-up schemes. The report of the committee did not distinguish itself through excessive boldness and, deterred by the high capital expenditure involved, made no proposals for the immediate execution of any scheme for interconnecting existing works as a whole. It only suggested that a standard system for interconnecting two or more undertakings was essential for any more comprehensive scheme in the future.⁹⁶ Even individual co-operation made little progress; only three groups of companies and two local authorities took advantage of the opportunity for collaboration.⁹⁷

Voluntary co-operation of local authority undertakers had its first chance—and missed it, in spite of a very real threat of State or company competition. It was to have many more—perhaps too many—in the history of electricity supply in Great Britain, and with very few exceptions the result was the same.

⁹⁴ Fabian Tract, 125, *Municipalisation by Provinces* (1905), p. 8.

⁹⁵ *El.*, 45 (1900), p. 54.

⁹⁶ *Rep. of the Jt. Com. Engineers to the Executive Com. of the Conference of Local Authorities and Companies*, June (1910), pp. 1 and 2.

⁹⁷ H. H. Gordon, *The Times*, 19-6-12, p. 28.

(c) New Public Authorities

Joint municipal action would at best have been a slow alternative to electric power companies, too much subjected to pressure in favour of the *status quo* and unlikely to pursue an active policy of eliminating inefficient local stations. To overcome parochialism and to develop a public electricity supply in the best interest of the community, large units of control were needed. A Fabian Tract in 1905 stated that the development of collective control of the economic life of society was largely dependent upon the capacity of the community to adapt its local government machinery to changing social and economic conditions. It called for new authorities and larger areas for the provision of electric light and power, as the existing limited authorities would become serious obstacles to industrial advance.⁹⁸ Another tract states that "there is not an administrative area that does not need immediate rectification. It is not done because of the clumsy and ponderous Parliamentary process necessary and because of local difficulties. Some new system of public administration must be evolved which . . . will organise on a scale large enough to guide and direct such services as power, transit, water and housing."⁹⁹

The Local Government Act of 1888 had created the modern County Councils, and the question arose whether they would be suitable as lighting authorities. The idea was favoured by the *Municipal Journal*, which preferred it to joint boards and committees in which there might be a great deal of friction and which would do only in an incomplete way what the County Councils could do properly.¹⁰⁰ Similarly, Fabians claimed that the County Council must be given power to generate electricity.¹⁰¹

The L.C.C. had already certain limited powers of electricity control and was anxious to widen its range of activities. It is, therefore, not surprising to find the council in the forefront of the fight for reorganisation of electricity supply in the Metropolis, a fight which will be described in more detail in the next chapter. London's example was not followed by other County Councils (except Durham, which developed an electric power scheme itself). The County Councils were still bodies with predominantly rural

⁹⁸ Fabian Tract, *loc. cit.*, 125, p. 2.

⁹⁹ Fabian Tract, 119 (1905), *Public Control of Electric Power and Transit*, p. 12.

¹⁰⁰ *Mun. J.* (1904), pp. 207, 292, 483.

¹⁰¹ Fabian Tract, 119, *loc. cit.*, p. 5.

interests, and were unwilling to undertake the responsibilities and risks of electricity supply. It is interesting to note, however, that two of the most successful rural electrification schemes undertaken in the 1930's were carried out by County Councils, namely the Dumfries and Kirkcudbright Counties.

The County Council Association openly stated that they were not interested and did not claim to be municipal traders.¹⁰² The Lancashire County Council did not even support the other local authorities in their fight against private schemes and decided not to oppose the Power Bills.¹⁰³

(4) *Mixed Undertakings*

There was little hope that reorganisation could be carried out with any existing Government agency, joint municipal boards were not very promising, but was it not possible to combine the initiative of the power company with the regard for the public interest associated with municipal trading in a mixed body on which both sectors of the industry might fruitfully co-operate?

In Germany a conflict between private undertakings and communal works was generally avoided, as frequently larger towns became associated with supply companies by subscribing a portion of their share capital and thus acquired a financial interest in their undertaking.¹⁰⁴ Public authorities had in some instances a voting majority at the general meeting and on the board of directors, although in practice the solid private vote often prevailed against the split public vote.

The German practice constitutes one possible relationship. A company owns the undertakings, but a considerable portion of the share capital is in the hands of the local authorities in the area. Such an arrangement was, however, entirely alien and in direct opposition to the aims of British municipal finance; the local authorities would become engaged in speculative undertakings for the purpose of making profits and could act in the public interest only indirectly.

In a mixed undertaking there are two interests in policy making which invite conflict and possibly stalemate, and have frequently led to the neglect of the public interest. It is reported that these

¹⁰² *Mun. J.* (1904), p. 551.

¹⁰³ *El. Rev.*, 44 (1899), p. 162.

¹⁰⁴ C. J. Fuchs, *Die Entwicklung der Gemeindebetriebe* (1909), pp. 7-9; H. E. Batson, *The Price Policies of German Public Utility Undertakings*, pp. 94 ff.

defects made the solution lose favour even in its native Germany.¹⁰⁵

Another possibility was the creation of a public authority owning the whole undertaking and supplying a large proportion of the capital. A company would be entrusted with the management and development of the undertaking for a definite period and under the supervision of the public authority.¹⁰⁶ The advantages of such a solution would be that the capital could be raised at the cheapest rate and under public control; the company would introduce greater elasticity of management, freedom from political interference and would guarantee continuity of policy.¹⁰⁷ A re-organisation intended to combine the best features of private and public enterprise actually formed the basis of the L.C.C. Bill of 1915, which will be considered later.

Although the limits of the functions of the public and private partner were more clearly defined, there remained the dualism of control which might easily lead to friction, delay and obstruction.

A third solution avoided this danger by creating a single authority with complete control, but consisting of representatives both of local bodies and private enterprise. Already in 1906 an Electricity Board on the lines of the Metropolitan Water Board had been suggested as the most rational solution for the control of the London Electricity Supply.¹⁰⁸ The experience with the Metropolitan Water Board was, however, not very favourable. This was an indirectly elected body of 66 members representing the L.C.C. and other County Councils, the Metropolitan Boroughs and Urban District Councils of Greater London. The L.C.C. had strongly opposed the principle of giving representation to all possible interests as leading to a vast unwieldy body, and a joint committee of both Houses of Parliament had accepted this view. But the Government insisted on the inclusion of the smaller local authorities on the board.¹⁰⁹ The Board proved to be slow-moving and prone to sectional conflict, and the Metropolis Water Act was held to have seriously over-compensated the private undertakings.¹¹⁰

¹⁰⁵ J. Landmann, "Moderne Organisationsformen der Oeffentlichen Unternehmungen." *Schriften des Vereins fuer Sozialpolitik*, Vol. 176 I. pp. 54, 340.

¹⁰⁶ Cf. J. N. Schooldred, *J. Soc. Arts* (1905), p. 721; *Mun. J.* (1906), p. 623; *Statist.*, 62 (1908), p. 1134.

¹⁰⁷ *Statist.*, 80 (1914), p. 115.

¹⁰⁸ *El.*, 57 (1906), p. 298; *Parl. Deb.*, 4th Series, Vol. 193 (1908), c. 1863.

¹⁰⁹ Sir Harry Howard, *The L.C.C. from within*, p. 340 f.

¹¹⁰ L. Gordon, *The Public Corporation in Great Britain*, pp. 23, 257.

The idea of a mixed authority which played an important role in the post-war construction schemes, was in no instance adopted during the period under consideration.

The foregoing examination of the various schemes for the reorganisation of the electricity supply industry shows that there was little of that co-operative spirit without which satisfactory reconstruction on voluntary lines was virtually impossible. Later experience has proved that only constructive legislation with definite plans and coercive powers could overcome the parochial egotism of small undertakings, whether public or private. It cannot be denied that "vested municipal interests can be and often are as obstructive to political changes and indifferent to social welfare as private financial interests. Local authorities have nothing to learn from business men in the matter of putting their own interests before those of the public welfare when the question of survival is at stake."¹¹¹

In the absence of a progressive development policy on the part of the Government, the attention of Parliament was merely directed towards the control and restriction of ambitious individual schemes, and possibly the alleviation of the restrictions imposed by earlier legislation. Small wonder that the Amendment Act passed eleven years after the Cross Report, which it proposed to implement, made hardly any constructive contribution to the major issues at stake.

IV. THE ACT OF 1909

The revolutionary changes in the technical conditions of generation and the need for an adaptation of the British electricity supply industry were realised by Parliament from the very beginning, and the Cross Committee had proposed certain amendments to the existing legislation in 1898. The findings of the Committee, already examined, formed the basis of a series of "Supply of Electricity Bills," regularly introduced and dropped every year from 1903-1906, but eventually passed in 1909 without great difficulty as the *Electric Lighting (Amendment) Act*.¹¹²

There had been a strong feeling among politicians that the problems raised by the power company Bills were too important for Private Bill legislation. Sir Wm. Harcourt in the debate on the second reading of the Lancashire Electric Power Bill, considered the

¹¹¹ W. A. Robson, *Government and Mis-Government of London*, p. 79.

¹¹² 9 Edw., 7, ch. 34.

proposal "contrary to public policy," being a method of avoiding the general law, and claimed that if such monopolies were to be granted, they should be beneficial monopolies governed by the general law and by a mature policy considered by Parliament.¹¹³

A general scheme of reorganisation could only be successful if it destroyed certain existing privileges and it was then bound to antagonise some vested interests. As the problem was further complicated by the municipal trading issue, it was obvious that legislation would be of a controversial nature. The Unionist Balfour and Salisbury, as much as the Liberal Bannerman Governments, were not very anxious to push their electricity Bills in Parliament and gladly accepted private legislation which left them free from responsibility.¹¹⁴

Thus power companies were allowed to establish themselves, whilst the general Bills were introduced, discussed, but never reached the final stages. The proposals did not vary much from year to year, but a distinct trend was noticeable in favour of restricting the privileges of companies and maintaining the powers of local authorities. Clauses for facilitating electric supply in a general way, such as power of compulsory purchase of land for generating stations, the right of breaking up streets, subject to the consent of local authorities, etc., found general acceptance, but the organisation of large-scale supply caused bitter controversy.

The Cross Committee had recommended authorising undertakings for the supply of electricity over large areas on conditions differing from the Lighting Acts, and all Bills had to deal with this important question of wholesale supply. Originally, only "companies or persons" could be authorised by provisional order to supply in bulk, as "there was a general feeling within the committee rooms of both Houses that trading by local authorities outside its areas was to a large extent, illegitimate speculation with the rate-payers' money."¹¹⁵ Nevertheless, the 1904 Bill was amended to enable local authorities to give bulk supply to neighbouring local bodies. The 1906 Bill added a provision empowering the Board of Trade to authorise a local authority, company or other authorised supplier, to supply for traction purposes to any railway or tramway partly within that area, including the lighting of premises within

¹¹³ *Parl. Deb.*, 4th Series (1900), Vol. 79, c. 1398-9.

¹¹⁴ Cf. Mr. Ritchie (*Pres. B.O.T.*), *Parl. Deb.*, 4th Ser., c. 1401.

¹¹⁵ *Id.*, 53 (1904), p. 714; *Sel. Com. of H.L. on Supply of Electricity Bill*, 1904, p. 68.

the area of supply. The Act itself gave full equality of power as regards bulk supply to companies and local authorities (Sec. 4) and added a further clause authorising the supply to premises just outside the area of an authority, if necessary without the consent of the neighbouring undertaking by the so-called "fringe" order procedure (Sec. 6).

In accordance with the recommendations of the Cross Report, the 1903 Bill provided that "the B.O.T. may exclude the application of the power of purchase if they consider it inapplicable either by reason of the undertaking being situated in a large number of districts or by reason of the objects of the undertaking not being such as can be properly carried out by a local authority" (Sec. 3), which leaves open the question, what constitutes the proper function of a local authority? Provision could be made for the constitution of joint committees or boards for the joint exercise of the purchase power by a number of local authorities (Sec. 5). The 1904 Bill provided that, in order to prevent the purchase right from being made illusory by placing the generating station outside the area of a local authority, such works, if supplying only one area, were deemed to be inside the area. On the other hand, it enabled a bulk supply undertaking to be excluded from compulsory purchase. In 1905 the transfer of purchase rights to other local authorities was authorised, thus making the exercise of this power a practical proposition (Sec. 4 (3)). The 1909 Act did not grant any exception from the purchase power of local authorities at all, but authorised a combination of local bodies for purchasing purposes (Sec. 7).

On the recommendation of the Cross Report, the 1903 Bill had proposed the removal of the provisional veto of municipalities by enabling the B.O.T. to grant provisional orders with or without their consent, except where a local authority was an authorised undertaker. In the 1909 Act this matter was completely dropped, "the sentiment of the B.O.T. veering towards the retention by the local authorities of the privilege of obstructing promoters of provisional orders."¹¹⁶

The passage of the 1909 Bill through Parliament was characterised by the strong desire of the Government to have the measure accepted, even if this meant concessions to clamorous minorities. Thus, whilst municipalities were successful in pressing their claims against the companies, their intention to obtain a general sanction

¹¹⁶ *El. Rev.*, 64 (1909), p. 302.

to let apparatus on hire and carry out wiring (a right which had been granted to many towns in private Bills) was defeated owing to the pressure from the electrical contractors. A clause had been inserted in the House of Lords allowing the wiring only to be carried out through electrical contractors, but, as this was unacceptable to the House of Commons, the Government agreed to the elimination of the whole clause from the Act, a victory for the contractors but a loss to electricity progress.

V. CONCLUSIONS

The adaptation of the electricity supply industry to the conditions of large-scale generation and transmission failed, not because it was technically impossible, nor owing to insuperable financial difficulties. The root cause was neither "municipal obstructionism" nor "capitalist greed"; it lay deeper in the important social issues involved.

Side by side public and private bodies had grown up providing electricity supply on fundamentally opposed principles, each party jealously guarding its privileges not only for their own sake but as essential key positions for the victory of their social outlook. As the opposing sides could muster practically equal political support, stalemate resulted, euphemistically called compromise, which very largely confirmed an obsolete *status quo*.

The necessity for larger units in electricity supply called for the destruction of the privileged independence of small authorities which were largely municipal bodies. An attempt, however, of company promoters to create larger areas necessarily appeared as an attack against the very principle of public enterprise and was, under the existing political conditions, doomed to failure.

Only a comprehensive government scheme would have had a chance of acceptance, which might have granted special concessions to power companies subject to proper safeguards and public control, or which would have created suitable regional local government bodies for the development of the industry. For reasons previously indicated, Parliament evaded the issue of constructive legislation, and when the Act of 1909 was passed it ignored completely the problems raised by the power companies and merely made some timid advances on the Lighting Acts of 1882-8. The desperate needs of the war of 1914-1918 proved its complete insufficiency and prepared the ground for a more active and conscious public planning of the electricity supply industry.

CHAPTER IV

LONDON'S STRUGGLE FOR ELECTRICAL UNIFICATION 1900-15

THE challenge of technical advance could be met in a number of ways, but, as has been shown, in general only the power companies took the initiative. In London, however, all the interested parties admitted the necessity for reorganisation and were induced by the pressure of public opinion and the threat of competing suggestions to put forward proposals of their own. Owing to this situation, the number and variety of schemes was great and their frustration pointed an important lesson.

I. THE NEED FOR REFORM

The value of "competition in the abstract" suggested by Major Marindin lay in the encouragement of experiment and in this it was undoubtedly successful. In the relatively small part of London in which competing undertakings were authorised (this was the case only in two out of sixteen boroughs with municipal undertakings, and in the boroughs where two companies were in competition, such as Bermondsey, Camberwell, the City, Finsbury, Greenwich, Holborn, Lewisham, Southwark, Westminster, the area of competition was actually restricted to only a few parishes), the existence of an electric lighting company providing direct current made it advisable for the rival undertaking to concentrate on the supply of alternating current, mainly for power. The London Electric Supply Corporation, the one big company which was authorised to compete with electric lighting companies, was a pioneer in the development of alternating current, and its decision to build the Deptford station far away from the centre of supply was one of the landmarks in the history of electricity supply and transmission.

Competition as a means of reducing prices and of safeguarding the consumers' interests did not, however, prove a great success. The chief engineer to the London County Council gave evidence before the Cross Committee to the effect that it was bound to break down in the course of time and that it had only not done so as yet because there was no very active competition in London.¹ Legislation prevented the amalgamation of companies and, prior to the Acts of 1908, even their association for strictly technical purposes.

As a result, the electricity supply of London consisted of a large number of independent undertakings, generally limited to the boundaries of a Metropolitan Borough, but sometimes even smaller, as in the case of Kensington, which divided its area between three companies. Municipal and company undertakings were completely interspersed, the local authorities predominating in the north and east, forming a ring round the companies in the west-end and suburbs.

No doubt many undertakings, both company and local authority, did their best to provide an adequate supply of electricity for lighting and power, especially after the various power schemes had introduced the threat of competition. Many local authorities adopted a very progressive development policy, e.g. St. Pancras and West Ham, the former noteworthy for carrying out a more vigorous canvassing and advertising campaign than any other authority in London. The charges for power were so low in some areas that comprehensive power supply schemes could not possibly have led to great savings.

The thickly-populated areas of the city, west-end and east-end developed on parochial lines, and it was only natural that in the west-end the predominant lighting load taken from obsolescent pioneer stations necessitated higher charges than the well-balanced mixed lighting and power loads in the east. In the near suburbs independent development within borough boundaries was less certain of success, and large companies were allowed to undertake the supply, the Metropolitan Electric Supply Company covering West London and the London Electric Supply Corporation and South Metropolitan Electric Light and Power Company covering South-East London.

On the outskirts of greater London a power company was founded in 1900, the North Metropolitan Electric Power Company, with the

¹ *Cross Report B.P.P.* (1898), IX, 213, q. 1824-5.

power of bulk supply to an ever-increasing, and after the Private Act of 1905, unlimited number of local authorities. This company, through its subsidiary, the North Metropolitan Power Distribution Company, acquired also provisional orders for retail distribution.

The resultant bewildering variety in the size of undertakings, systems and technical and economic conditions, was unsatisfactory notwithstanding the efficiency of individual authorities. Whilst other great cities had a single generating station of up to 70,000 h.p., London was in the hands of 72 electricity authorities supplying from 66 stations with an average size of only 3,000 h.p.² The use of electric power compared very unfavourably not only with other cities abroad but with some English towns, as is shown for 1908 in the schedule below³ :—

Town	Units per head of population		
	For power	For lighting	Total
London	9.3	28	37.3
6 large British towns	12.2	12.7	24.9
6 medium British towns	15	9.2	24.2
Berlin	20.7	15.8	36.5
Chicago	24.3	36.9	61.2

The average price for power was higher even than in a number of small British towns, and considerably above the rates of large and medium British towns, where the average charges were below 1d. Conditions in London were by no means particularly difficult ; on the contrary, the structure of industry in greater London was exceedingly favourable for electric power development : innumerable small factories which could not generate power cheaply for themselves would most readily have become consumers had they been able to obtain cheap power ; coal and land were excessively dear, so that alternative sources of power were much more expensive than in many parts of Northern England.⁴ Cheap electric power was essential to assist industry and provided the only hope of stopping the emigration of industries out of London, which, at that time, caused serious concern to the government.⁵

² *The Times Eng. Supp.*, 3-7-1907, p. 209.

³ W. H. Morley, *J.I.E.E.*, 42 (1908), p. 10.

⁴ Cf. Mr. Bonar Law, Parliamentary Secretary to the Board of Trade, *Parl. Deb.*, 4th Series, 1905, V. 148, c. 1423 ; *Ed. Rev.*, 99 (1906), p. 1.

⁵ Mr. Churchill, *Pres. Board of Trade, Parl. Deb.*, 4th Series (1908), V. 199, c. 1874 ; *Ed.*, 57 (1906), p. 298.

The contradiction between the possibilities of development and the unsatisfactory reality was so glaring that many of the best engineers were tempted to improve the position by means of a concentration of generation ; they prepared various comprehensive schemes of reorganisation.

(1) *Concentration of Generating Plant*

There was probably general agreement amongst engineers about the advantages of concentrating generation in large cities.⁶ As Mr. J. F. C. (afterwards Sir John) Snell expressed it, "if there was virgin ground, no engineer would dream of a small local station instead of purchasing energy in bulk and distributing it accordingly."⁷

The existing situation was most uneconomical, as 66 stations were running independently with their own reserve plant ; the annual extensions to them amounted to as much as £1,000,000 in 1907.⁸ Some of the existing small stations might have been equipped with modern plant, but many sites were incapable of extension or lacked the necessary water resources for condensing.⁹ Companies and boroughs agreed on the desirability of concentrating generation in a small number of large central stations linked together in a common inter-connecting system.¹⁰

Granted that the development of large stations was advisable, there still remained the question how to achieve this end, and two alternative policies found consideration :—

1. To allow the extension of eight or ten of the best existing stations, and gradually abandon all the others.
2. To aim at the gradual abolition of all the stations in or near the Metropolitan area, and the concentration of production of electricity for all purposes on several interconnected sites well outside.¹¹

In the report on London electricity supply submitted to the L.C.C. in 1914 by Messrs. Merz and McLellan, the authors explained that the first alternative would be easier to carry out, and would save in cost of transmission, but after looking into the position very

⁶ *The Times*, 27-11-13, p. 21 ; *Statist*, 55 (1905), p. 340.

⁷ *J.I.E.E.*, 52 (1914), p. 142.

⁸ *The Times Eng. Supp.*, 3-7-1907, p. 209.

⁹ F. Bailey, *J.R.S.A.*, LXI (1913), p. 539.

¹⁰ Cf. Merz Evidence, Camperdown Committee, quoted *El.*, 54 (1904-5), p. 430 ; *Cross Report, loc. cit.*, q. 1709 and 1716 ; *El.*, 60 (1907-8), p. 385.

¹¹ *Merz and McLellan Report to L.C.C.* (1914), p. 9.

carefully they found that it would only be possible to find sufficient water for condensing from the Thames, so that only stations on the river would be suitable. On most existing sites it would be difficult to store coal or handle it in the best way, and there would be high costs of transporting coal to stations "above bridge," i.e. higher than London Bridge. They further mentioned the difficulties of by-product development at existing stations, and the disadvantage on hygienic grounds of having such stations in the centre of London.¹²

For these reasons, Merz and McLellan were in favour of the second alternative and reached the following conclusions¹³ :—

- " 1. Assuming all the existing generating stations for the supply of light and power in the central area were in the hands of one authority, it would pay that authority to shut them down, sell most of the plant and generate all the energy they produce on sites down the river.
- " 2. The saving in working costs which the existing undertakings in the ' central area ' could effect by obtaining their current from such a concentrated plant supply for all purposes, would be no less than 18 per cent. or about £170,000 per year, after allowing for all capital charges on the new plant and mains.
- " 3. The initial capital outlay required for this purpose, allowing for growth of demand during the next four years, would be between £6,000,000 and £7,000,000. . . .
- " 5. To supply the general domestic demand from ten model stations on any of the present sites would cost, including capital charges, at least 20 per cent. more than plant concentrated on sites down the river.
- " 6. If the comparison be made not with ten new stations, but on the assumption that the existing plant in the ten best existing stations be re-arranged and utilised to the best advantage, the policy of extending on the existing sites shows to still less advantage.
- " 7. If the necessary concentration of plant could be effected by extending two or three of the existing sites ' below bridge,' the saving in the cost of transmission would be out-weighed

¹² *Ibid.*, p. 11.

¹³ *Ibid.*, p. 12.

by the disadvantages of such a policy, even on financial grounds.

- "8. A policy initiated by the concentration of production on sites down the river is the right one for London on financial grounds, apart from its very great advantages. Its immediate adoption is essential to economy."

Klingenberg, the engineer of the Berlin power station, advocated a drastic reorganisation and suggested the closing down of 22 existing stations, and the provision of a new 80,000 kW power station. He expected savings in all works costs of about 40 per cent. at an increase in total capital cost of less than 20 per cent.¹⁴

The schemes were severely criticised by the Metropolitan Boroughs and a number of engineers who contended that the reorganisation would not lead to any improvements, as costs, even without any reform, would reach lower figures than those visualised in the proposals; it would be very difficult for bulk supply to deliver electric energy at a cheaper rate than could be generated from extended plant.¹⁵

The disagreement appears to be due to different expectations as to the growth of demand. Merz anticipated an increase in the near future of more than twenty times with the development of the practically untapped cooking, heating and traction demands. A mere extension of small plant would obviously be quite insufficient to cope with such an increase and a bold policy of construction was only common sense. On the other hand, the opponents of new stations expected simply a continuation of the existing rate of growth of demand and feared that a large part of any new plant would remain unused for a considerable period.¹⁶ On the basis of this modest anticipation, it might be cheaper to convey coal to some existing station nearer the centre of demand rather than provide extensive copper mains from distant works.¹⁷

Events proved Mr. Merz to be the better prophet, but irrespective of the question of immediate profitability, a comprehensive scheme for London sooner or later would necessitate the construction of large stations, as the extension of existing plant had at best only limited scope. By continuing the independent growth of relatively

¹⁴ O. Klingenberg, *Electricity Supply in Large Cities*, *J.I.E.E.*, 52 (1914), p. 133.

¹⁵ *J.I.E.E.*, 52 (1914), p. 142.

¹⁶ *El. Rev.*, 74 (1914), p. 684.

¹⁷ F. Bailey, *J.R.S.A.*, LXI (1913), p. 539.

inefficient stations, considerable additional capital was bound to be wasted, thus rendering an eventual reorganisation more difficult and costly. Snell appreciated this danger and made proposals which sounded less revolutionary than the Merz scheme, but contained the same ideas. He suggested that eight existing stations should be retained and extended as first-class stations, that another ten stations should be extended to a limited degree, whilst all the other stations would be gradually superseded by a large bulk supply plant which should be put in hand immediately.¹⁸

The opposition to large new stations was undoubtedly largely due to the fear that their construction would mean the end of small independent plant and probably of the small local undertaking. Political considerations, therefore, overshadowed even this completely technical problem.

II. REORGANISATION PROPOSALS, 1902-08

In this section a short description is given of various attempts to provide a comprehensive electricity supply scheme for London, leaving out of account the more modest, and more successful, partial solutions found by the companies supplying electricity over large areas, such as the Metropolitan Electric Supply Company, County of London Electric Supply Company, and the North Metropolitan Electric Power Supply Company.

(1) *Power Company Schemes*

Whilst the initiative for the reform of London's electricity supply originated with the London County Council, the first serious attempts to solve the problem were made by private concerns. It is, therefore, advisable to discuss the power company schemes first.

(a) *The Administrative County of London and District Electric Power Company Limited*

In 1905, a group of capitalists interested in the Tyneside power company, and including such well-known financiers as Mr. C. E. Hambro and Mr. S. Insull, promoted a company and brought forward a comprehensive scheme prepared by Mr. Merz. A Bill was introduced to empower the company to give bulk supply only to existing undertakings and railways in the "non-industrial

¹⁸ *J.I.E.E.*, 52 (1914), p. 143.

district" of London covering mainly the city and west-end, and to supply in addition for power in the "industrial district" of the east. The Bill was drafted on the lines of the typical power Bills and allowed for a restriction of profits by means of a sliding scale at a standard rate of dividend of 8 per cent.

Originally, it demanded the grant of a permanent concession, but on the pressure of the L.C.C. a clause was inserted empowering a public body to acquire the undertaking after 42 years at the original cost, less depreciation. The scheme provided for the building of a "super generating plant" and was so brilliantly worked out that there was little serious opposition on the technical side. As Mr. Bonar Law, then Parliamentary Secretary to the Board of Trade, remarks, it was noteworthy that the Opposition laid stress on the fact that cheapness was not everything: "if Counsel could have said with any chance of being believed that this claim for cheapness was unfounded, and that the Bill would not give the cheapness, he thought Counsel would have preferred that argument."¹⁹

The fight for the Bill was conducted mainly on political lines: it was strongly opposed by the existing companies and local authority undertakings. The fear was expressed that the companies least able to resist would be attacked first and by degrees the larger ones would be absorbed with the result that in four or five years' time London would be in the hands of a large syndicate, running on American lines.²⁰ Even in the electrical press doubt was expressed as to whether the object of the Bill was really assistance to the existing undertakings and not competition for the more profitable power load.

Actually, considerable modifications of the Bill were made during the committee stage in the House of Lords and House of Commons, certain features to which objection had been taken, were removed by agreement with the existing undertakings. Thus the companies and some local authorities were to be left free to develop their business to its full extent, but agreed to renounce further extension of their generating plant after a period of years and promised to take bulk supply instead. The compromise achieved appeared satisfactory and the Bill passed through all the Parliamentary stages; only the delaying tactics of the opponents succeeded in preventing

¹⁹ *Parl. Deb.*, 4th Series, V. 148 (1905), c. 1413.

²⁰ Mr. John Burns, *Parl. Deb.*, *loc. cit.*, c. 1422.

a third reading during the 1905 session. It was practically certain that the measure would be passed during the next session, unless a comprehensive alternative scheme was proposed.

When the Bill re-appeared in 1906, it provided for the modifications agreed to during the previous year and made special concessions to the big companies, such as the Charing Cross Company, County of London Company, and London Electric Supply Corporation. During that session, however, the L.C.C. brought forward a Bill of its own and the competing measures were sent to a "Hybrid Committee," which decided that a London scheme should be carried out by the L.C.C., and not by a company. They agreed that the proposal of the Administrative County Company was conceived on scientific lines and calculated to afford a cheaper supply of electrical energy at private risk, but required clarification to what extent the necessary paramount authority of the L.C.C. and its ultimate possession of the enterprise could be secured.²¹

In accordance with the ruling of the committee, the promoters proposed in a Bill, brought forward for 1907, "to incorporate a company and to confer power on the company and the L.C.C. to enter into agreement for the purpose of giving effect to the recommendation." The L.C.C. could retain for itself a part of the undertaking, while permitting a private concern to undertake the other part. The County Council was to be empowered to lease for a substantial consideration the whole enterprise to the company.²²

This was the first attempt to solve the problem of control by co-operation of two important interests, namely a power company and the L.C.C.; such co-operation was, however, intended to cover only a very limited sphere, and did not go far beyond the concession of a licence by a local authority to a company, under the 1882 Act. Neither the existing companies nor the Metropolitan boroughs were parties to the agreement. The chances of the Administrative County Bill improved considerably when, in March, 1907, the L.C.C. election returned a Conservative majority which refused to undertake the electricity supply of London and proposed to lease it to a company. It was assumed that the pro-

²¹ Special Report of Sel. Com. on L.C.C. (Electric Supply) Bill, 1906, B.P.P. (1906), XI, 219 (18).

²² *Garcke's Manual of Electrical Undertakings*, Vol. XI, p. 26.

motors of the Bill had come to an agreement with the new council on this point.²³

A solution on these lines might have been a great advantage for London, and it must be considered unfortunate that Parliament, in the hope of a better settlement, opposed the L.C.C. Bill and thereby defeated another attempt to improve the electricity supply of greater London. The undertaking proposed would at least have given scope for a speedy development, whilst retaining a closer control by the public than the solution found by later legislation.

(b) Other Power Company Schemes

There were other power company schemes for London, generally of less ambitious character, of which the Bill of the Additional Electric Power Company, introduced in 1906, distinguished itself by the suggestion of giving bulk supply from a generating station at St. Neots in Huntingdonshire, 50 miles from London, and transmitting current on overhead lines at the high voltage of 20,000 V. It was rejected on "second reading."

During the session 1907-8, another comprehensive scheme was submitted by the London and District Electric Power Company based on the technical details of the L.C.C. Bill. The company proposed to give bulk supply and power supply to large consumers in accordance with the Kitson Clause and provided for the purchase by the L.C.C. after 42 years.²⁴ The Liberal Government and the L.C.C. supported the Bill, realising that there was no hope for a municipal bulk supply of electricity to London.²⁵ They pointed out that the right of the Borough Councils to purchase the company undertakings in 1931 was only nominal and could not be made effective, and accused the councils of opposing the measure (as they had opposed the L.C.C. schemes) for purely parochial reasons.²⁶

The local authorities and companies opposed the Bill as unnecessary, monopolistic, and granting the L.C.C. purchase power over areas which were outside its control. The companies, further, pointed out that under the then existing stringent conditions of the money market, the necessary capital would be very difficult to obtain, whereas they had ample means to carry out their own

²³ *El.*, 59 (1907), p. 8.

²⁴ *Statist.*, 61 (1908), p. 158; *ibid.*, 62 (1908), p. 425.

²⁵ *Parl. Deb.*, 4th Series (1908), Vol. 193, c. 1856, 1871.

²⁶ Sir J. Bann, *ibid.*, c. 2870.

scheme.²⁷ The Bill was rejected by the House of Commons Committee, which favoured the voluntary association of existing undertakings.

(2) *The L.C.C. Schemes*

As early as 1898 a conference of the L.C.C. and the local authorities of Greater London had examined the possibilities of large-scale supply and the threat of the new power companies. They passed a resolution insisting that the purchase clause of the Lighting Acts should also be applied to any power company which might be established in London. The L.C.C. should be in a position "to undertake, if it so determined, and if so requested by the local authorities, the supply of electrical energy in bulk for the convenience of any district, provided they did not become competitors of such local authorities."²⁸

As a result of this conference, the London County Council put forward a Bill in 1902 empowering it to purchase undertakings with the consent of the local authorities concerned and to give a supply of electricity to any local authority. The promoters claimed that their only object was to secure for London as a whole those advantages with regard to electric supply which benefited every other city,²⁹ but the Government, perhaps guided by its hostility to any further increase in the powers of the Council,³⁰ objected, as the measure was dealing with a difficult matter "in a partial and unsatisfactory manner." The proposal certainly failed to provide a complete reorganisation and concentration of supply in London, but was purely an enabling Bill. The President of the Board of Trade did not consider the question at all urgent, but gave his assurance that the Government were fully alive to the fact that sooner or later the problem would have to be dealt with by legislation and that it had better be dealt with in a public Bill.³¹

In spite of the Government's opposition, the Bill was given a second reading; the lighting companies called the proposal a breach of the Parliamentary bargain of 1888, as the risk of being purchased by the L.C.C. would be considerably greater than that of

²⁷ *El.*, 62 (1908-9), p. 193.

²⁸ Quoted *El.*, 41 (1898), p. 255.

²⁹ *Parl. Deb.*, 4th Series, Vol. 105 (1902), c. 16.

³⁰ Cf. *supra*, p. 17.

³¹ *Parl. Deb.*, *ser. cit.*, c. 22-4.

having to hand over their undertakings to the Metropolitan boroughs.³² The City of London and Westminster also objected to the Bill and a Select Committee of the House of Commons rejected the measure.

A similar Bill was introduced again in 1903, but was withdrawn by the L.C.C. in view of the Government's promise of early general legislation. A Supply of Electricity Bill was duly introduced in 1903, but it and successive Bills until 1909 failed to pass through Parliament and gave company promoters the opportunity of pressing forward with their own private Bills. As we have already noted, the urgent need for reorganisation, combined with the excellent foundation of the scheme, very nearly led to the passing of the 1905 Administrative Power Company Bill. The L.C.C. had itself to provide facilities of large-scale supply³³ if it desired to prevent the creation of a private monopoly.

The Council therefore decided, somewhat hurriedly, to submit a Bill of its own in 1906 and asked for power to give bulk supply, if necessary in competition with other power companies. The area covered the County of London and surrounding districts, altogether 387 square miles, of which only 115 were within the County of London. The scheme was in every respect a copy of some of the existing power company Acts, being entirely an enabling Bill without any obligation on the part of the L.C.C. to give, or on the part of any existing distributing authorities, to take supply. It was largely based on the estimates of the Administrative County of London Bill and bore definite marks of improvisation. The chances of its being passed by Parliament were considered so small as to encourage the belief that it was promoted as a fighting measure to drive a favourable bargain with the company.³⁴

The original suggestions were later supplemented by exact details, which earned the admiration of the electrical press. The weakness of the proposal was the ambition of the L.C.C. to beat the power companies at their own game, instead of going further and planning a comprehensive reorganisation on the prestige of a public authority. It is not surprising that financial opinion, including the L.C.C. Finance Committee itself, was unwilling to support an undertaking open to the competition by other power companies

³² *El.*, 49 (1902), p. 105.

³³ *Mun. J.* (1905), p. 560.

³⁴ *Statist.*, 56 (1905), p. 1160; E. Garcke, *Progress of Electrical Enterprise* (1907), p. 42.

and which could only hope to sell electricity if it could undercut existing undertakers from the very beginning.³⁵ The promoters of the Administrative Bill adduced the experience of the Lancashire Power Company to prove that no bulk supply scheme alone could pay. One of the main essentials of a successful power scheme was to enter into contracts for the hiring out of machinery for the purpose of assisting manufacture, an aspect entirely neglected in the L.C.C. proposal.

The majority of the local authorities approved of the Bill, but the companies feared that many boroughs would become retail distributors in competition with them, if they could easily obtain bulk supplies from the L.C.C. The Conservative Government in power was of the opinion that large-scale supply was a kind of business which could only be secured by extreme push and energy and by taking risks which local authorities ought not to take.³⁶ The prospect of the Bill brightened, however, when the Parliamentary Election of 1905 brought into power a Liberal Government in which John Burns, the ardent protagonist of municipal trading from Battersea, became President of the Local Government Board. Mr. Lloyd George, as President of the Board of Trade, gave the municipal scheme first consideration and suggested that only the L.C.C. Bill should be sent to a Select Committee.³⁷

The Committee reached certain important conclusions :—

- (1) that there was an urgent need for a comprehensive scheme including all the districts forming part of Greater London ;
- (2) that the L.C.C. was a suitable authority for carrying out the scheme, but that as a public body it should have definite obligations to supply electricity to any authorised distributors and within a reasonable period ;
- (3) that the actual management of the undertaking should be either in the hands of the L.C.C. or partly under its control and partly handed over to a company under the supervision of the L.C.C., or might be leased as a whole to a company for a definite period.³⁸ The Committee rejected the L.C.C.

³⁵ *El.*, 57 (1906), p. 79.

³⁶ *Parl. Deb.*, 4th Series, Vol. 148 (1905), c. 1427.

³⁷ *Parl. Deb.*, 4th Series, Vol. 154 (1906), c. 958.

³⁸ Special Report of Select Committee on L.C.C. (Electric Supply) Bill, 1906, B.P.P. (1906), XI, No. 219, s. 18.

Bill as submitted as not bold enough and respecting too much the existing interests.³⁹

A new Bill was submitted in 1907 which adopted the suggestions of the Select Committee and was altogether a more ambitious measure. The area of supply was extended to cover 450 square miles, and the L.C.C. undertook to supply in bulk to the existing undertakings and large consumers, such as railways, docks, etc., and also to give power supply direct to consumers in accordance with the conditions of the Kitson Clause. Perhaps the most important feature of the measure was the attempt to consolidate the supply in London by asking, not only for the transfer of the purchase rights of the local authorities to the L.C.C., but also for the right of compulsory acquisition of the undertakings of local authorities in the County of London after five years, by taking over their liabilities. Even before that time, the Council wanted control over the capital expenditure of the municipal bodies. Local authorities outside the county area should have the right to hand over their undertakings to the L.C.C. if they so desired.

The Bill further provided for the right of the Board of Trade to revise prices charged by the authorised undertakings in the London area on application by the L.C.C.⁴⁰ This time the Finance Committee of the L.C.C. was satisfied with the estimates of the Highways Committee, and only objected to the terms of acquisition of local authority undertakings as being too generous.

The estimates of the promoters were very closely examined by the companies and local authorities opposing the scheme, but they could find no more damning fault than that the proposed large generating stations would only make a small profit when two-fifths of their capacity were utilised.⁴¹ The early stages in large-scale production always suffer from unused capacity, but the L.C.C. proposal anticipated a rapid increase of demand, and, consequently, an early recovery of initial losses. Another objection was directed against the almost unlimited power of increasing the indebtedness of the Council.⁴²

In view of the approaching L.C.C. election, the discussion of the scheme became a major political issue and wild and largely irrelevant

³⁹ *Mun. J.* (1906), p. 733.

⁴⁰ *Garcke's Manual of Electrical Undertakings*, Vol. XI (1907), p. 17.

⁴¹ *Statist.* 59 (1907), p. 174.

⁴² *Parl. Deb.*, 4th Series, Vol. 174, c. 431.

claims and counter-claims were made. The election of March, 1907, was fought with great bitterness and the Conservative "Municipal Reform Party" made a determined effort to capture the Council, which had been under Progressive rule since its beginning. At all cost the alliance between a strong Radical Government and a Progressive L.C.C. had to be averted.⁴³ They warned the public that the Council proposed to oust not only private enterprise, but private ownership, from the greater part of the economic domain and to substitute municipal ownership in its place,⁴⁴ and that the Progressive Party was dominated by the Socialist theories set forth in a manifesto of the Independent Labour Party.⁴⁵ The Progressive Party itself had been weakened, as many of its outstanding personalities had been elected to Parliament and government positions. The election led to an overwhelming victory of the Municipal Reform Party to which, according to *The Times*, the electricity issue had largely contributed. Obviously the new Council could not adopt the Bill of its predecessor without alterations, but after some hesitation its Parliamentary Committee came to the conclusion that none of the Private Bills before Parliament constituted a satisfactory settlement of the question, apart from the L.C.C. Bill, and that the withdrawal of the Bill "would postpone the solution of this most important and pressing question for an indefinite period."⁴⁶ The Council proposed to drop the right to acquire compulsorily the undertakings of Metropolitan boroughs, and the transfer of purchase rights to itself throughout the area and reduced the amount of expenditure from £4,500,000 to a mere £100,000. The company undertaking would have been purchaseable by the L.C.C. after 50 years, and its charges would meanwhile be controlled by means of a sliding-scale of tariffs and dividends.⁴⁷

The Council decided to adopt the last alternative suggested by the Parliamentary Committee, providing for the leasing of the undertaking to a company, and preliminary arrangements were made with the Administrative County of London Company for co-operation. The modified Bill found very strong opposition in Parliament, the Liberal majority being suspicious of the intentions

⁴³ Gibbon and Bell, *History of the L.C.C.*, 1889-1939, p. 100.

⁴⁴ *The Times*, 25-1-07, leading article.

⁴⁵ *Ibid.*, 11-1-1907.

⁴⁶ *L.C.C. Min. of Proc.*, 7-5-1907, p. 959.

⁴⁷ *L.C.C. Min. of Proc.*, 11-6-1907, pp. 1165 ff.

of the Conservative L.C.C. and afraid that it would grant excessive powers to the company. The Government itself considered the L.C.C. Bill as the best solution under the circumstances, and Mr. Lloyd George, in supporting its second reading, warned members not to allow their views to be coloured by political considerations.⁴⁸

Nevertheless, the Parliamentary Committee examining the Bill rejected it, mainly because it was not satisfied that public interest was sufficiently safeguarded. The *Electrician* was probably right in stating that the defeat was caused by those who preferred no scheme at all to one that would be worked by a company,⁴⁹ and who expected that the Progressives would shortly return as the majority party on the Council, and would put forward a more comprehensive municipal scheme. This hope was to be disappointed, as the Municipal Reform Party remained in power until 1934. The rejection of the scheme marked the defeat for a number of years of any attempt to establish a comprehensive system of electricity supply in London.

(3) *Schemes of Existing Undertakings—The London Electricity Supply Acts 1908-1910*

The defeat of the Power Company and L.C.C. schemes was not due to any feeling that all was well with the electricity supply situation; on the contrary, as we have seen, there was practically general agreement that reform was absolutely essential. Would reorganisation be based on the existing undertakings? Had the local authorities and companies learnt the lesson that only by close co-operation could they prevent the creation of new and over-riding authorities?

There is little evidence of any general desire for close co-operation either in a representative body or in a committee charged with the planning and control of a co-ordinated scheme. The idea was favoured by the *Municipal Journal*, which suggested a mixed board on which all interested parties, even the factories and users, would be represented,⁵⁰ and received favourable consideration by the *Statist*.⁵¹ The existing electricity authorities, however, only wanted legislation which would render voluntary co-operation of individual under-

⁴⁸ *Parl. Deb.*, 4th Series, Vol. 174 (1907), c. 450.

⁴⁹ *El.*, 59 (1907), p. 413.

⁵⁰ *Mun. J.* (1906), p. 623.

⁵¹ *Statist*, 62 (1908), p. 1134.

takings possible. Amalgamation of companies was prohibited without special Parliamentary authorisation,⁵³ and, although competition between companies was no longer considered an effective safeguard of the public, the permission of amalgamation would have been opposed as an outright grant of monopoly to the companies, rendering them even more difficult to control than a power company.⁵³

Several private Bills had been passed authorising the giving of bulk supply, and by 1907 three local authorities and six companies had extended their activities in this way. A more general measure was proposed in the London Electrical Supply Companies Bill of 1906, which would have enabled all or any of the London companies to enter into agreements for mutual assistance and combination, for bulk supply, provision of new stations, connecting of stations, and common management. A company should also be able to enter into similar agreements with any local authority in the L.C.C. area. A similar Bill was put forward for the West London electricity undertakings.

At the time, the Bills were completely overshadowed by the more comprehensive L.C.C. and Administrative County Bills, but they reappeared as the London Electricity Supply Bills in 1907.⁵⁴ In view of the general desire for comprehensive schemes, the new Bills provided for a more rigid organisation by proposing the formation of a Joint Committee representative of the companies within the County of London and any local authority prepared to come into the scheme. The committee was to be given power to manage new stations and take over existing plant, supply in bulk to any authorised distributor within the county and over a considerable area outside, and to make arrangements for mutual assistance with the power companies on the outer fringe of London. It proposed a clause providing for the purchase of all undertakings combined in the Joint Committee by a single purchasing authority in 1949.⁵⁵ The Bill intended to eliminate gradually, or at least prevent the extension of, the less efficient plant then existing, and to concentrate generation in the six best stations. The proposal was criticised as not providing an adequate guarantee of any real

⁵³ *El. Lighting (Clauses) Act*, 1899, Schedule 3.

⁵⁴ Cf. Bonar Law, *Parl. Deb.*, 4th Series, Vol. 148 (1905), c. 1429.

⁵⁵ *Garcia's Manual*, Vol. XI (1907), p. 28.

⁵⁶ Quoted *El.*, 59 (1907), p. 8.

improvement in the position,⁵⁶ as the committee was likely to show a weakness for retaining existing uneconomic plant, especially in view of the admitted difficulties of overcoming the differences of pressures and systems in neighbouring undertakings⁵⁷.

The L.C.C. strongly opposed the idea of a Joint Committee which would be free from the strict public control and supervision imposed on ordinary electricity companies, and, in spite of the plea made by the promoters that, without the Joint Committee, no co-ordinated scheme could be put into operation,⁵⁸ Parliament cut this part out of the Bills, but passed the innocuous remainder in three Acts, the *London Electricity Supply Act*, 1908,⁵⁹ the *London (Westminster and Kensington) Electric Supply Companies Act*, 1908⁶⁰ and the *London Electricity Supply Act*, 1910.⁶¹

The provisions of the Acts were purely permissive, enabling companies and local authorities, with the approval of the Board of Trade, to enter into agreements for mutual assistance or for association with each other in regard to certain specified purposes, namely the giving and taking of bulk supply ; the management and working of generating stations or parts of undertakings ; the appropriation and division of receipts and the provision of capital in consequence of such agreements ; and matters connected with any of these purposes. (Sec. 3.) It was, however, specifically provided that such agreements must not affect the rights of third parties in any way.

The only exception to this rule was the permission to lay mains for connecting any two areas or generating stations through another borough (Sec. 4), but a local authority undertaking within the Administrative County of London through whose area a main interconnecting other local authorities would be laid, should have the right of demanding a bulk supply on terms no less favourable than the other parties to the agreement (Sec. 6). No corresponding rights were given to local authorities situated between two company areas or to any companies.

At the instance of the Government, the Acts provided for a transfer of the purchase rights of the Metropolitan boroughs to the

⁵⁶ *Statist.*, 60 (1907), p. 540 ; *ibid.*, 62 (1908), p. 425.

⁵⁷ Cf. Chief Electrical Engineer to L.C.C., quoted *El.*, 62 (1908-9), p. 153 ; *El. Rev.*, 62, p. 813.

⁵⁸ *El.*, 60 (1907-8), p. 420.

⁵⁹ 8 Edw. 7, ch. 167.

⁶⁰ 8 Edw. 7, ch. 168.

⁶¹ 10 Edw. 7 and 1, Geo. 5, ch. 140.

L.C.C. which, in addition, was given the same right over undertakings within the County of London, which had not hitherto been subject to compulsory purchase. An obligation was imposed on the Council to give three years' notice of its intention to exercise its purchase powers, the date of purchase remaining unaltered at 1931. The Council could exercise its purchase right only over all companies simultaneously, subject to certain small exceptions (Sec. 23). In order to ensure a satisfactory service by the companies after the tendering of notice, clauses were inserted to control the price policy after that date (Sec. 24), and companies were given the right to require the L.C.C. to grant loans for legitimate capital expenditure (Sec. 26).

In addition, the L.C.C. was given the right to make representations to the Board of Trade with regard to any proposal for an agreement between undertakers (Sec. 3), but had no power of veto.

This was the modest result of four years' struggle for the reorganisation of London's electricity supply: the removal of a few restrictions on the co-operation of undertakings, and the hope that, in spite of the prohibition of company amalgamation, a voluntary co-ordination would succeed in overcoming the obstacles which had obstructed electricity progress for so long.

III. THE FAILURE OF PERMISSIVE LEGISLATION

After the passing of the Acts a conference of local authorities and companies in the London area appointed an executive committee which, in 1909, passed a resolution "that the municipal and company engineers be asked to create and appoint a general committee of four for the purpose of reporting upon a joint scheme for the supply of London under the 1908 Acts." The joint committee duly issued a report. They did not recommend the immediate execution of any general linking-up scheme of existing works; they were satisfied that most existing stations were capable of meeting all the requirements for the next ten years without any joint scheme, but proposed a standard system for inter-connecting two or more undertakings.⁶²

No information is available to show whether the engineers felt so lukewarm about an inter-connection scheme for purely technical reasons. At any rate, in view of their advice, it is not surprising

⁶² *Rep. of Jt. Com.* (1910), pp. 1 and 12.

that the practical results of the Acts were very small. Only two local authorities and three companies made arrangements for closer co-operation.⁶³

It was widely felt that, whilst the Acts had removed certain harmful restrictions of earlier legislation, more than that was necessary for any substantial progress in London's electricity supply. In the view of Mr. H. H. Gordon, the Acts should have enforced a linking-up scheme and the L.C.C. should have been given purchase rights over the local authority undertakings and control over the companies even before the purchase date.⁶⁴

The one positive result of the period of schemes and Bills was that the threat of comprehensive legislation was a spur to existing undertakings to reduce prices and improve facilities. Between 1904-8 charges fell by as much as 30 per cent. in the areas of the Metropolitan Electric Supply Company and the County of London Electric Supply Company.⁶⁵ Individual progress, in fact, was noticeable in many parts, as will be seen from a comparison of the supply statistics issued by the London County Council.

The following percentages may serve as an illustration :—

Percentage Increases, 1911-12, compared with 1905-06

	<i>Local Authorities</i>	<i>Companies</i>
Capital expenditure.. ..	+ 20%	+ 12½%
Revenue	+ 53%	+ 4%
Plant capacity	+ 53%	+ 19.8%
Units sold	+ 125%	+ 34½%

In discussing these figures, the *Electrical Review* referred to the comparatively greater progress of the municipal undertakings, which it considered was due to their lead in prices and efficiency.⁶⁶

The development in the local authority areas, although remarkable, was again purely local, and very little had been done in the direction of inter-connection and elimination of inefficient stations. In their report on the L.C.C. Bill,⁶⁷ the Metropolitan boroughs agreed that progress had been slow, but accused the L.C.C. of effectively preventing the utilisation of the measures designed for

⁶³ L.C.C. *Min. of Proc.*, 7-11-1911, p. 978 ; *The Times*, 6-3-1913, p. 13.

⁶⁴ H. H. Gordon, in *The Times*, 19-6-1912, p. 28.

⁶⁵ *El.*, 61 (1908), p. 453.

⁶⁶ *El. Rev.*, 75 (1914), p. 1.

⁶⁷ Quoted *El.*, 74 (1914-5), p. 603.

their benefit by means of its rigid financial policy. Up to 1906 most of the loans for electric lighting purposes were sanctioned for an all-round term of 42 years, but afterwards the periods were designed not to exceed the useful life of the works for which the loans were given, and amounted to only 20 years for electrical plant and machinery.⁶⁸ Extensions of plant had to earn money immediately and had to be designed on a far smaller scale than a wiser policy would have justified.⁶⁹

The approach of the purchase date was the reason given by the companies for the lack of co-operative schemes. The saving which could be expected from linking up existing and frequently obsolete plant was probably not big enough to make the commercial risk worth while, and it was doubtful whether capital could be obtained by the companies on reasonable terms for such a purpose.

The County of London Electric Supply Company, therefore, promoted a Bill in 1914 for facilitating mutual assistance by enabling companies to enter into agreements with the L.C.C. for the postponement of the compulsory purchase date and variation of the terms. The other London companies were opposed to the Bill, and as the L.C.C. had the whole question under review it was not prepared to prejudice its future policy. The Bill was, therefore, withdrawn by the promoters⁷⁰

(1) *The L.C.C. Scheme, 1914*

The L.C.C. was by no means satisfied with the parochial development and in a Special Report,⁷¹ the Finance Committee drew attention to the necessity for formulating some policy of co-ordination, especially in view of the fact that the Council might decide to purchase the company undertakings in 1931. The committee advocated a linking-up of Borough Council undertakings for mutual support as well as for economy, instead of extending a number of comparatively small and unprofitable concerns. In some particular cases the taking of bulk supplies from companies would be the best solution. Borough Councils should be prevented from

⁶⁸ Rep. of L.C.C. Finance Committee on Financial Relationship between the Council and the Local Authorities of London in the matter of Loans, *L.C.C. Min. of Proc.*, 7-11-1911, p. 973.

⁶⁹ Quoted *EL.*, 74, *loc. cit.*

⁷⁰ *L.C.C. Min. of Proc.* (1914), I, pp. 458, 1284.

⁷¹ *L.C.C. Min. of Proc.*, *loc. cit.*

extending uneconomic plant, but under existing legislation the L.C.C. had no power of refusing a loan sanction to a council on other than purely financial grounds. In the opinion of the committee, additional powers of control should, therefore, be sought. In order to obtain a comprehensive picture of the situation, the Council appointed a special committee to whom Messrs. Merz and McLellan submitted a detailed and carefully-reasoned report in March, 1914. The consulting engineers came to the conclusion that mere power of financial control over local undertakers would be insufficient and that the only complete and satisfactory solution would be to establish a new undertaking, with such power as would enable it to concentrate production, standardise and unify distribution, and bring about amalgamation.⁷²

There was not, in their opinion, sufficient cohesion among either the companies themselves or the Borough Councils to form even the nucleus of such a body. In considering the various possible agencies of such unified control, they found that if private enterprise was to be entrusted with it, a company formed under the auspices of the existing companies would be most successful, on condition that the L.C.C. ensured sufficient unanimity between the various interests and sufficient driving force and financial support to carry the scheme through energetically on the best and broadest line and that it allowed for the inclusion of the Borough Council undertakings.⁷³

If the new authority was a public body, any problems of control or re-purchase would be avoided, cheap capital could be secured, profits would be used for the benefit of the consumer and not of the shareholder. On the other hand, the compulsory purchase of existing undertakings might necessitate excessive expenditure for obsolete plant and goodwill, etc., and would raise all the problems inherent in municipal management of large speculative undertakings.

The L.C.C. Committee rejected both the public authority and company solutions, as "any scheme promoted with either of these arrangements as basis would, to ensure success, entail such a disturbance of existing arrangements as would be likely to seriously imperil its prospect of passing in Parliament."⁷⁴

⁷² *Merz and McLellan Report to L.C.C.* (1914), p. 19.

⁷³ *Ibid.*, p. 21.

⁷⁴ *L.C.C. Min. of Proc.* (1914), II, p. 457.

(2) *The Novel Solution : A Mixed Undertaking*

The committee therefore advocated a solution which they hoped would incorporate the advantages of both municipal and company control without their drawbacks and dangers. They recommended the formation of a mixed electricity undertaking, combining municipal ownership and control with company management,⁷⁵ and the Council adopted this suggestion in its London and District Electricity Supply Bill of 1915.

A London electricity authority was to be formed covering the area of nearly 1,000 square miles, more than twice the area included in the L.C.C. Bill of 1907. The L.C.C. realised that it could not claim exclusive control over such a large district and proposed to create a joint body consisting of representatives of the L.C.C., the County Councils and County Boroughs of outer London, the assessable value forming the basis of representation.

The authority was to bring about the gradual unification of electricity supply by ultimately absorbing all the existing undertakers, but its immediate function was to construct large-scale generating stations, to supply in bulk for traction and power and for domestic purposes in undeveloped areas.

The relationship of this new body with the existing undertakings was of the greatest importance, and every effort was made not to antagonise them, and to interfere with their rights as little as possible. Certain over-riding powers were, however, essential for the success of the reorganisation.

1. The approval of the authority would have to be obtained for any new generating station planned by an existing undertaking.
2. Local authority undertakings were to be required to take bulk supply from the new body instead of extending their generating plant if it could be shown to the satisfaction of the Board of Trade that it would be more profitable for them to do so.
3. The authority was to have power to advance money for enabling existing undertakings to arrange for a bulk supply.
4. The authority was to obtain the right of compulsory purchase over company undertakings held by the L.C.C. and the local authorities in outer London, with the result that most companies would then be purchaseable by one single authority.

In addition, any undertaking could voluntarily agree to be taken over by the authority.

⁷⁵ *L.C.C. Min. of Proc.* (1914), II, pp. 453 ff, 979 ff.

The novelty of the scheme lay in the proposal that the actual management of the undertaking should be in the hands of an operating company, entrusted with full powers for a period of 50 years, after which it would be purchased by the public authority against payment of the capital sum originally expended by the company. To ensure a common desire for efficiency, the Bill proposed that both parties were to contribute an agreed share of the capital, except that the money required for the voluntary transfer of existing undertakings was to be borne by the parent authority alone.

The company was to pay interest on the capital subscribed by the authority and for all other expenditure on revenue account, before paying any dividends to its shareholders. There was to be a limitation of such dividends and any surplus was to be divided between reserve funds and a reduction of rates.

To ensure close and continuous public control of the operating company, the authority was to acquire the following powers :—

1. To approve any proposal by the company involving capital expenditure.
2. To approve the financial arrangements of the company, such as the nature and terms of capital raised.
3. To approve, during the last ten years of the company, all agreements and contracts.
4. To apply to the Board of Trade for revision of maximum charges from time to time.
5. To take any other action for the protection of the interests of the consumers.

The success or failure of the mixed undertaking depended on the frictionless operation of such dual control; the promoters suggested the formation of a permanent intermediary body, a technical committee, consisting of the chairman of the authority, its engineer, financial adviser, and an outside member appointed by the Board of Trade. This committee should act for the authority in an executive capacity and should consider and report on matters in which the approval of the authority was necessary.

The proposed solution gave full representation to company interests and the L.C.C., County Boroughs and County Councils within the area of Greater London. The Metropolitan boroughs, however, and smaller authorities outside the L.C.C. area, were not to have any influence in the scheme, probably in order to avoid the

creation of an unwieldy body consisting of many and opposing interests. No wonder that they were hostile to the new Bill.⁷⁶ Although the scheme did not foresee any immediate interference with their rights and powers, they feared that the new authority's power of indirect compulsion would be overwhelming, as any extension of plant would be subject to its approval and would probably be withheld in order to force the local authorities to take a bulk supply.⁷⁷

The opposition to the proposed authority went, however, far deeper. The boroughs could not reconcile themselves to the idea of a combination of public and private enterprise which, in their opinion, had the virtue of neither and the vices of both, as the undertaking could neither work solely in the public interest nor display the interest characteristic of private enterprise. The dual control of electricity supply might be an admirable system in theory, but it was bound to lead to friction, if not frustration, in practice. The mixed undertaking had originated and found widespread adoption in Germany, but even there, as already mentioned, the danger of conflict later reduced its popularity.⁷⁸

Nevertheless, the L.C.C. Committee recommended that the scheme should be pursued even in war time, as otherwise there would be a constant and probably increasing expenditure for the extension of existing undertakings.⁷⁹ To enable the Council to proceed with the promotion of the Bill, an absolute majority of the full Council was necessary, but as this was not secured the Bill could not be introduced.⁸⁰

(3) *The London Electric Supply Bill (No. 2), 1915*

Another compromise between private operation and public control was suggested by a group of London supply companies which, in the London Electric Supply Bill (No. 2), 1915, proposed the formation of a holding company under the supervision of the Board of Trade.⁸¹

The new company would undertake to submit a comprehensive scheme for the provision of a unified system of generation and

⁷⁶ *El.*, 74 (1914-5), p. 369.

⁷⁷ Report of Conf. of Met. Boro. on the Bill, quoted *El.*, *loc. cit.*, p. 603.

⁷⁸ Cf. p. 64 *supra*.

⁷⁹ *L.C.C. Min. of Proc.* (1914), II, p. 720.

⁸⁰ *Loc. cit.* (1915), I, p. 127.

⁸¹ Cf. *El.*, 74 (1914-5), p. 369.

distribution within three years of the passing of the Act. No direct interference with existing undertakings was asked for, but extension of plant was to be subject to the approval of the Board of Trade, and, if the company could show that it was able and willing to supply the undertaking at a price not greater than its cost of generation, the Board of Trade should have the power of instructing the authority to take supply from the company.

Other far-reaching powers of control were to be given to the Board of Trade, such as the approval or the modification of the original scheme and the fixing of terms for bulk supply, in order to safeguard the public interest in what was in effect a scheme of amalgamation.

The reception of the proposal was by no means enthusiastic, even amongst companies. Although the plan was "quite a reasonable proposition which would utilise to a large extent, organisations which were already in existence,"⁸² a number of important companies, such as the County of London Electric Supply Company, strongly opposed the Bill. In spite of the large powers to be given to the Board of Trade, an effective control of the proposed undertaking might have been very difficult, if not impossible, and even critics favourable to the companies feared, as a result, a further watering of capital, "which was already larger than it should be."⁸³ The Bill was withdrawn.

At the outbreak of war in 1914, the organisation of electricity supply in London was as unsatisfactory as it had been ten years before, but the time and money expended on schemes for reorganisation were perhaps not completely wasted. The solutions proposed for London could be examples and guides for the wider schemes of reorganisation of electricity supply in the country as a whole, which were the subject of extensive enquiry throughout the war.

Unfortunately the lessons of London experience were not learnt and the same hopes of voluntary co-operation of conflicting vested interests again found expression in the legislation of 1919, which forms the subject of a later chapter.

⁸² *Ibid.*

⁸³ *El.*, 72 (1913-14), p. 994.

CHAPTER V

ELECTRICITY IN THE FIRST WORLD WAR

IT would be a fascinating study to investigate the impact of the last war upon the electric supply industry in detail, to examine to what extent the natural inherent strength of the industry overcame the disabilities of its organisation under the pressure of national need and found improvised solutions for the important question of power supply. On the other side, it would be illuminating to establish how shortcomings and failures could be traced back to the parochial system of electricity supply. Unfortunately, there is little contemporary information available, as for obvious reasons details could not be published during the war and the subject was not considered sufficiently important to be fully reported afterwards. For the purpose of this book, it will be sufficient to examine in general the service rendered by the industry and to concentrate attention on the proposals put forward to meet the new conditions of war and peace.

I. ELECTRICITY UNDER WAR CONDITIONS

The war brought important changes to the electricity supply industry. The munition needs of the country necessitated the construction of new ordnance factories, generally in safe rural areas, which entirely depended on the speedy provision of power. As electric generating stations existed in all parts of the country, a supply could be obtained from them with little loss of time.¹ The result was a remarkable development in power load connection, with a practically continuous demand²; indeed, the output of munitions achieved would probably have been unattainable but for the electricity works, as under continuous operation, with the

¹ T. Roles, *J.I.E.E.*, 68 (1930), p. 57.

² *Crocker's Manual of Electrical Undertakings*, XX (1916-7), p. 87.

depleted staffs, the maintenance of private power plant becomes impossible. In the factories put down for the production of munitions during the war, 95 per cent. of the machinery was driven by means of electricity.³

The sudden increase in demand for electricity occurred at a time when capital goods and raw materials became increasingly scarce and labour was rapidly absorbed into the armed forces. A strict government control of capital expenditure was imposed and extensions of electric power stations and mains systems were restricted. A special Electric Power Supply Department of the Ministry of Munitions was formed to approve applications for extensions and to grant priority certificates.⁴ In order to achieve closer co-operation between government departments, the War Cabinet Priorities Committee set up, during 1918, the Electrical Services Supply Committee, to ensure uniformity in the use of electricity and to consider the requirements of various government departments.⁵ Even with priority, the installation of new plant was bound to take considerable time, with the result that existing generating stations were used to their utmost capacity. The reserve plant capacity in most central stations was reduced to a margin which would be considered totally inadequate in normal times.⁶

At the beginning it was necessary, therefore, to put back into service plant which was obsolete and uneconomical, as the authorities were chiefly concerned with obtaining more electricity. Later, however, when the shortage of coal grew into a serious problem, economy in the use of coal for the production of electricity became a vital question.⁷ The ever-increasing demand, combined with the growing difficulties of satisfying it, revealed the serious weaknesses of the electric supply industry,⁸ and, although the munition work was benefiting to an incalculable extent from the public supply of electric power, there were "many broken links of efficiency and above all a needlessly high rate of coal consumption."⁹ The use of isolated small plant was uneconomical and possibly

³ B.P.P. (1917-8), XVIII, 315, p. 8.

⁴ A. B. Gridley and A. H. Human, *El. Power Supply during the Great War*, *J.I.E.E.*, 57 (1918), p. 406.

⁵ *Ibid.*, p. 411.

⁶ J. A. Robertson, *J.I.E.E.*, 54 (1916), p. 596.

⁷ T. Roles, *loc. cit.*

⁸ F. W. Purse, *J.I.E.E.*, 86 (1940), p. 18.

⁹ *The Times Eng. Supp.* (1917), p. 76.

dangerous, and the Board of Trade encouraged inter-connection of stations¹⁰ as a means of utilising more fully the capacity of existing plant.

For various reasons, mostly of a technical character, little actual progress was made with linking-up schemes during the war,¹¹ but new stations and extensions of existing plant were approved to a very large extent, as can be seen from the following figures¹² :—

	1914	1918
Plant capacity of 327 municipal undertakings	705,000 kW	1,490,000 kW
Plant capacity of 230 company undertakings	430,000 kW	788,000 kW
Average size of generating unit	522 kW	7,044 kW
Largest unit installed	8,000 kW	25,000 kW

It is estimated that during the latter half of the war the annual rate of production of electrical plant amounted to 400,000 kW of generating plant and 600,000 kW of motors.¹³

Another factor which gained considerable importance owing to war conditions was the security of supply. The dependence of vital industries on the provision of electric power made any interruption of supply a very serious loss, with possibly dangerous consequences for the prosecution of the war. The large number of relatively small plants in existence had the advantage of localising any failure to a comparatively small area, but the danger of a break-down was considerably increased by the use of obsolete plant and the practically continuous demand for power, which rendered repairs extremely difficult. The increasing adoption of standby plant for ordinary use removed any reserve which would have been readily available.¹⁴ Furthermore, the new weapon of air bombardment was likely to endanger the efficiency of plant in yet another way. Mr. Merz did not exaggerate when he stated "that the extent to which any given area tended to depend on electricity was becoming too serious to allow it to be supplied from one station," and he recommended the provision of large inter-connected plant as the solution.¹⁵

¹⁰ See below, p. 102.

¹¹ T. Roles, *loc. cit.*

¹² A. B. Gridley and A. H. Human, *loc. cit.*, p. 408.

¹³ *Ibid.*, p. 543.

¹⁴ Cf. J. A. Robertson, *J.I.E.E.*, 58 (1920), p. 48.

¹⁵ C. H. Merz, *J.I.E.E.*, 54 (1916), p. 589.

II. ELECTRICITY A FACTOR IN NATIONAL POST-WAR RECONSTRUCTION

Electricity was playing a vital part on the production front during the war, and the public began to realise its importance in the economic life of the nation both in war and peace. Many of the difficulties which were bound to arise during the re-adjustment to peace conditions could, it was thought, only be disposed of with the aid of electricity.

A wild scramble for markets was anticipated immediately after the end of hostilities, in which Great Britain could only be successful if her industry was efficient and well prepared. The proposed prohibition of imports of enemy goods for a period of years and a general imposition of import duties to protect certain industries, including the electrical industry,¹⁶ whilst favouring British manufacturers at home, was obviously more than useless in overseas markets; as the Williamson Report observed, "when British industry is subjected to the test of keen international competition after the war, its success will depend upon the adoption of the most efficient methods and machinery, so as to reduce manufacturing costs as much as possible."¹⁷ As power was considered an important element in manufacturing costs, which (in the somewhat sweeping generalisation of the Haldane Committee) may be most efficiently supplied by the medium of electricity,¹⁸ the lowest possible cost of electricity appeared to be a condition of success for British industry as a whole.

Electricity was expected to play an important part in other aspects of post-war economic policy. It was thought desirable for the British Empire to become more self-contained and the Haldane Committee proposed that processes involving some millions of h.p. at that time worked in America, Norway, Sweden, Germany, etc., could and should be carried on in England by means of electric power.¹⁹

To make this vision of restrictionism, protectionism and cut-throat international competition as a peace prospect more palatable, an increase in wages was proposed, again with the aid of electricity. "It is only by largely increasing the amount of power used in

¹⁶ Cf. Parsons Committee on Electrical Trades, B.P.P. (1918), XIII, p. 11.

¹⁷ B.P.P. (1918), VIII, 613, s. 2 (1).

¹⁸ B.P.P. (1917-8), XVIII, p. 4.

¹⁹ *Ibid.*

industry that the average output per head (and as a consequence the wages of the individual) can be increased. The pre-war earning power of each individual was far too low."²⁰

The vital rôle assigned to electricity in many post-war schemes confirmed its position as a key industry whose progress and efficiency was of national importance. Even before the war this had been realised by engineers of vision,²¹ who had welcomed the concentration of generation in large stations and the few agreements for bulk supply and inter-connection as "most desirable steps in the right direction," but had considered the question too big to be solved with isolated arrangements. Only a broad national scheme could overcome the obstruction from local narrow-mindedness and short-sightedness.²² A national emergency presented an opportunity which would never recur, of getting rid of the old system in which local authorities worked in a series of water-tight compartments, and to break down the artificial barriers imposed by municipal and county boundaries.²³ The Incorporated Municipal Electrical Association (I.M.E.A.) and the Incorporated Association of Electric Power Companies, representing the most powerful electrical interests, formed a joint committee on national electric power supply and came to the conclusion that the question of generation must be considered irrespective of the existing areas of electric supply undertakings.²⁴ Various other committees appointed to consider electricity supply, all investigated the subject from that broad angle and made accordingly recommendations for introducing a national development scheme in place of the existing purely permissive legislation. Both the industry and the government took an extraordinary interest in the reorganisation of electricity supply, and the large amount of agreement reached on the measures to be adopted justified the hope of speedy and effective legislation immediately after the war.

The proposals followed two main lines of approach, one group stressing the need for a central controlling and co-ordinating body, the other favouring a less radical solution by means of voluntary regional inter-connection.

²⁰ *Ibid.*

²¹ Cf. Ferranti, *J.I.E.E.*, 52 (1914), pp. 123 ff, p. 146.

²² J. A. Robertson, *J.I.E.E.*, *loc. cit.*, p. 33; *The Times Eng. Supp.* (1916), p. 169.

²³ *The Times Eng. Supp.* (1917), p. 17.

²⁴ Quoted *Garcke's Manual*, XXI (1917-8), p. 25.

(1) *National Schemes*

The war-time discussion on electricity reorganisation commenced with a paper by Mr. E. T. Williams, in which he proposed a national scheme of large power stations under the control of a central body responsible to Parliament.²⁵ Shortly afterwards the Reconstruction Committee of the War Cabinet (later Ministry of Reconstruction) appointed the Coal Conservation Committee, which formed a sub-committee under the chairmanship of Lord Haldane to investigate the electric power supply in Great Britain. Mr. C. H. Merz served on this committee, which, in 1917, issued an interim report.²⁶ It reached the conclusion that a complete reorganisation, with regional development under central supervision was necessary. The committee was accused of bias in favour of power companies,²⁷ which considerably weakened the authority of its tentative recommendations regarding the reorganisation of the industry. A Board of Trade Committee under the chairmanship of Sir Chas. Parsons, appointed to investigate the position of the electrical industry as a whole,²⁸ stressed the urgent need of cheap electricity and recommended the use of large plant and the subordination or elimination of small and uneconomic stations. They considered new legislation and the creation of an independent Board of Electricity Commissioners essential, and suggested the appointment of yet another committee for determining in detail the administrative framework. After some difficulties regarding the representation of municipal interests, the Electric Power Committee was formed under the chairmanship of Sir Archibald Williamson (later Lord Forres), which published its report in 1918.²⁹

The Williamson Committee, as its predecessors, came to the conclusion that the existing state of affairs in the electric supply industry was against the national interest and wasteful of fuel resources, but differed from the Haldane Report in three important respects.

- (1) In its advocacy of the principle of public ownership as against the power company control implied in the earlier report.
- (2) In its advocacy of the amalgamation of existing interests in

²⁵ *J.I.E.E.*, 54 (1916), pp. 581 ff.

²⁶ Haldane Report, *B.P.P.* (1917-8), XVIII, 585.

²⁷ *El. Rev.*, 82 (1918), pp. 1, 171; *Man. J.*, 27 (1918), pp. 3, 145.

²⁸ Parsons Report, *B.P.P.* (1918), XIII, 355.

²⁹ Williamson Report, *B.P.P.* (1918), VIII, 611.

District Boards with considerable regional self-government.

- (3) In making detailed suggestions regarding the constitution and administration of the proposed bodies.

The report appeared to be in accordance with public opinion³⁰ and formed the basis of the Electric Supply Bill of 1919.

The administrative recommendations of the Williamson Report were closely examined by a Committee of Chairmen of the Advisory Council in the Ministry of Reconstruction³¹ who considered them as unsatisfactory. They doubted whether the administrative machinery recommended would be sufficiently speedy and effective for the purpose. "Immediately on the termination of the present war an opportunity will arise for recasting the whole of the existing arrangements for the supply of electric power in the United Kingdom on a comprehensive and practical basis; but if the necessary administrative machinery is not immediately created or, if created, is not of a character that can promptly and efficiently deal with the immediate demands in a manner calculated to secure the maximum development of electric power supply in this country, this opportunity will be lost and the difficulties of the existing system will go on multiplying and become permanent."³² The committee, whilst disclaiming any Socialist sympathies, came to the conclusion that only a national system of electricity generation and a unified control was likely to lead to the thorough and speedy development of electricity necessary for the future success of British industry.

(2) *Voluntary Local Arrangements*

At the same time as the ambitious schemes of national re-organisation were developed, the urgency of utilising existing facilities to the fullest extent encouraged proposals of a more modest character, which could, however, be put into operation immediately. Already during the discussion of Mr. Williams' paper in Manchester, Mr. J. A. Robertson suggested the creation of electricity districts in which the existing central stations could be linked up at moderate cost, and the formation of joint boards consisting of representatives of the supply authorities and independent members for deciding and carrying out a common policy.³³ At his suggestion, a committee

³⁰ Cf. *I.M.E.A. Proc.* (1918).

³¹ Birchcough Report on Electric Power Supply, B.P.P. (1919), XXIX, 43.

³² *Ibid.*, s. 4.

³³ *J.I.E.E.*, 54 (1916), pp. 596 ff.

was immediately formed by the supply undertakings of Lancashire and Cheshire to consider a suitable scheme of inter-connection.³⁴ Shortly afterwards the Board of Trade issued a circular calling attention to the desirability of linking-up and joint working of undertakings on the basis of the 1909 Act, promising government assistance for any schemes of that kind.³⁵ In London, Yorkshire, South Wales and other areas similar committees were formed by local undertakings to discuss a suitable method of inter-connection, on the understanding that this was to be a first step towards a thorough reorganisation of the industry directly after the war, opening up the way for a more comprehensive scheme of centralisation as soon as conditions became normal.³⁶ The local committees naturally concentrated on the problems specific to their areas and were in some danger of losing sight of the national aspect of the matter. At the same time the broader issues involved came under investigation by a committee of the Institution of Electrical Engineers, and a Joint Committee of the Incorporated Municipal Electrical Association and the Incorporated Association of Electric Power Companies. The last-mentioned committee issued a memorandum in September, 1916, expressing agreement with the immediate aim of linking-up, but stressing the national point of view and indicating that a comprehensive national scheme was necessary.³⁷

III. REORGANISATION PROPOSALS

There appeared to be practically general agreement on the lines along which reorganisation should proceed: inter-connection of stations, a central controlling body and regional executive boards to take over generation and transmission.

(1) *Interconnection of Stations*

Arrangements for linking up could be made without additional legislation and offered an immediate answer to some of the more pressing problems. It could be carried out at a minimum of cost in a reasonable time, although it would, admittedly, only be a partial

³⁴ *Garrick's Manual*, XX (1916-17), p. 91.

³⁵ Reprinted *Eng.*, 121 (1916), p. 443.

³⁶ J. A. Robertson, *El. Rev.*, 79, p. 682; *El.*, 79 (1917), p. 779; *El. Times*, 54 (1918), p. 82.

³⁷ Quoted *Garrick's Manual*, XXI (1917-8), p. 25.

solution and could be only considered a war-time expedient.³⁸ The authorities perhaps under-estimated the technical difficulties inherent in linking up different systems of supply, such as the problem of parallel running of power plant.³⁹ The problem was closely discussed by the Institution of Electrical Engineers, where there was a tendency to stress the numerous supposed difficulties of parallel running, the problems of transmission, and voltage and power factor regulation.⁴⁰ Actual experience both in Lancashire and on the North-East Coast had, however, proved that all these obstacles could be overcome,⁴¹ although the provision of the necessary equipment might not be easy.

The various local committees appointed to formulate schemes of inter-connection were faced with difficulties which were not mainly of a technical nature. The Lancashire and Cheshire Committee first published an interim report, which was a useful recapitulation of principle rather than a practical proposal⁴²; a second report followed, in which they implicitly acknowledged the complications of any mere linking-up scheme and stressed the necessity for a thorough reorganisation with strong powers for the proposed joint boards.⁴³ Their programme included the erection of huge generating stations.

An interesting example of the disappointing progress of linking-up schemes is that of Islington and St. Pancras. A report published by the latter borough stated "that none of the adjoining installations generated power at the voltage or periodicity suited to the Council's needs. Linking-up was an illusion; bearing in mind the exceedingly low steam consumption obtainable with the new turbines in operation, and having regard to the extra capital expenditure in linking up, it would be difficult to show any commercial economy allowing a saving in coal consumption."⁴⁴

The danger inherent in piecemeal local inter-connection became apparent. The wider national or even regional considerations were frequently neglected and schemes were examined purely from the point of view of immediate local advantage. Greater utilisation of

³⁸ *Eng.*, 123 (1917), p. 271.

³⁹ Cf. *El. Times*, 50 (1916), p. 261.

⁴⁰ J. S. Peck, *J.I.E.E.*, 55 (1917), pp. 61 ff., 179.

⁴¹ *Ibid.*, p. 79; *El. Rev.*, 79 (1916), p. 682.

⁴² *El. Times*, *loc. cit.*

⁴³ *El. Times*, 52 (1917), p. 116.

⁴⁴ Quoted *El. Times*, 50 (1916), p. 214.

existing generating plant would tend to perpetuate indefinitely uneconomic stations.⁴⁵ Williams considered it one of the first tasks to decide on a system of trunk mains and suitable frequencies and pressures. Inter-connection between stations should not be carried out from one station to another, but through the trunk main, and each engineer would have to ask himself whether he would not be serving the interests of his undertaking best by changing his system to comply with the system of the district rather than spending money on inter-connecting plant.⁴⁶ Later proposals provided for regional instead of national networks. Large districts of inter-connected supply were to be formed, the de-limitation of areas for this purpose to be carried out with sole regard for the best results and irrespective of the boundaries of existing supply undertakings.⁴⁷

Regional inter-connection was not sufficient in itself for increasing the efficiency of electricity supply, but without it uneconomic plant could not be taken out of service. The construction of large new plant must form an essential part of any scheme, and the decision as to which station should be retained or scrapped, was bound to affect vitally the pace and extent of progress. If the new station, under whatever control, were merely given the power of supplying energy required in excess of the capacity of existing stations, i.e. if undertakers were only prevented from extending their plant, but would continue to run their existing stations, the position would, in effect, be similar to that of power companies, and it would be impossible to concentrate generation in the most efficient stations.

On the other hand, the proposal of forcibly shutting down many stations was bound to antagonise the engineers in charge of such plant. The solution lay in a sensible compromise for which guidance and, if necessary, decisions from a strong controlling central authority were necessary.

(2) *Central Controlling Body*

Under the existing legislation electricity supply undertakers were subject to the control of the Board of Trade and local authorities depended for the approval of loans on the sanction by the Local Government Board (later Ministry of Health) and, in London, of

⁴⁵ Haldane Report, *loc. cit.*, s. 29.

⁴⁶ J.I.E.E., 55 (1917), p. 76.

⁴⁷ *Memorandum of Jt. Com. of I.M.E.A. and I.A.E.P.C.*, quoted *Garratt's Manual*, XXI, (1917-8) p. 25.

the L.C.C. This control was, however, largely restrictive and was confined to questions of financial security without regard to the suitability of any proposed expenditure from the point of view of electricity development.⁴⁸ With the growing national importance of electricity supply the need arose for a more positive control, and the Williamson Committee could refer to a general consensus of opinion that one central authority should be formed and that steps should be taken immediately to establish it. The powers connected with the generation and supply of electricity, exercised by the Board of Trade, Local Government Board, etc., should be transferred to a body, called the Electricity Commissioners.⁴⁹

So far there was agreement, but a wide divergence of views became apparent with regard to the functions and responsibilities of the proposed new Board. One side urged the appointment of Electricity Commissioners free from political influences; in fact, independent of any Government Department and Parliament, with wide powers of control. Especially power companies favoured this suggestion; they hoped that a powerful body of experts would overcome the opposition of municipalities and would favour large undertakings. The Commissioners were to be given authority to decide which stations should be scrapped⁵⁰ and to arrange for the establishment of electricity boards in each district; they were also to act as arbitrators in any dispute.⁵¹

The temptation to grant dictatorial powers was great, in view of bitter experience in the past, when political interests had opposed necessary technical reforms. Unfortunately, however, reorganisation of electricity supply was not only a technical problem; an expert board could decide which station should be scrapped and could determine the technical details of a regional scheme, but the organisation of suitable executive bodies was beyond its scope. Indeed, even the development policy was so vitally important for the national well-being that some public control was necessary. The Williamson Committee, therefore, recommended that the Electricity Commissioners be appointed by the President of the Board of Trade and responsible through him to Parliament.⁵² Such a board,

⁴⁸ Parsons Report, *loc. cit.*, p. 28; E. T. Williams, *loc. cit.*, p. 582.

⁴⁹ Williamson Report, *loc. cit.*, s. 29.

⁵⁰ E. T. Williams, *loc. cit.*, p. 583.

⁵¹ Haldane Report, *loc. cit.*, s. 40; App. E.

⁵² Williamson Report, *loc. cit.*

with a clear mandate from Parliament as to the general lines of policy and responsible to it for its actions, was likely to be less influenced by the pressure of local interests than any locally-elected authority. The Williamson Committee further restricted their functions to the judicial and technical fields with the additional elastic duty of "encouraging supply," and rejected the idea of a central authority owning and managing generating stations and wholesale distribution,⁵³ which had been strongly opposed by both companies and municipalities.⁵⁴

(3) *Regional Organisation*

A National Bulk Supply Board would have been a permanent threat to the existence of all electricity undertakings and seemed a less satisfactory solution of the problem than the alternative of regional authorities composed of the various interests concerned, but directed and supervised by the central planning authority. Joint municipal boards and technical association of companies were possible under the existing legislation, and it would have been simple to revise the law and to encourage the formation of joint boards comprising municipalities and companies.

A body of opinion urged that any further attempt of State interference would only be harmful and that the industry should be left alone to make its own arrangements. The proposals of the various regional committees considering linking-up schemes in accordance with the Board of Trade circular were welcomed as signs that the supply authorities were willing to undergo a process of voluntary liquidation and reconstruction which would be preferable to a policy of coercion through a national scheme.⁵⁵

A committee of representatives of the various electrical industries, such as the British Electrical and Allied Manufacturers' Association (B.E.A.M.A.), the Cablemakers' Association (C.M.A.), the Incorporated Association of Electric Power Companies, the Federation of British Industries and the Institution of Electrical Engineers, expressed the view that the "preparation of schemes . . . should be left as a matter of free and natural development to the initiative of undertakers,"⁵⁶ although they agreed that it might be necessary

⁵³ E. T. Williams, *J.I.E.E.*, 54 (1916), p. 584.

⁵⁴ Cf. J. S. Highfield, *ibid.*, p. 591; I.M.E.A. Circular, reprinted in *El. Rev.* 81 (1917), p. 129.

⁵⁵ *Eng.*, 124 (1917), p. 453.

⁵⁶ Quoted *Garcie's Manual*, XXIII (1919-20), p. 19.

in some cases for the Electricity Commissioners to propose the enforcement by Parliamentary authority of an arrangement for inter-connection or amalgamation of supply undertakings. The resolution was sent to the Board of Trade without reference to the Council of the I.E.E., an action severely criticised by engineers and the Press.⁵⁷

Such a permissive measure did not commend itself at that time, and even conservative proposals went usually further and provided for the creation by the Commissioners of electricity districts for which joint boards consisting of representatives of supply authorities and large consumers should be appointed.⁵⁸ A solution of this kind would have granted the widest possible autonomy within a compulsory regional framework, but would have left the ultimate power with the existing authorities.

The various regional committees themselves accepted the necessity for a national scheme, but wanted to reserve as much freedom as possible to local interests. The Committee for Lancashire and Cheshire proposed the establishment of a joint board representing local authority and company interests, with district boards for local operation. Its function was to be co-ordination of generating plants, advice and proposals for future expansion and linking-up between companies and local authorities.⁵⁹ It soon became obvious that no satisfactory solution would be found without some central control and that the existing authorities could not be left in full possession of executive powers—otherwise the reorganisation would be doomed to failure. This was the experience in Lancashire, where the committee came to the conclusion that, to make linking-up effective, a full measure of central control was necessary. The hours of running a large station must be controlled by a central authority, and consequently the central authority must also decide at what station extensions of plant should be carried out. The erection of new stations by the central board followed as a matter of course. The majority of the committee felt that the report, to be of any value, must put forward a full scheme which would provide not only for linking up, but also for the joint ownership and control of generating stations. The report was discussed at a conference representing 35 supply authorities

⁵⁷ *El.*, 83, p. 113; *El. Rev.*, 84, p. 115.

⁵⁸ J. A. Robertson, *J.I.E.E.*, 54 (1916), p. 598.

⁵⁹ *Eng.* 124 (1917), p. 171.

in December, 1917, and by a majority of two to one local authorities refused to consider the latter portion of the engineers' scheme, dealing with the purchase of existing stations and the erection of new stations.⁶⁰

Voluntary linking-up schemes on a small scale could be successful, such as the inter-connection between Manchester and Salford, but, in spite of what the *Engineer* called a growing belief that it would be preferable to develop the new system on the foundations of the old by the voluntary union of existing undertakings and development under joint boards,⁶¹ the conviction was undoubtedly very widely held that a more sweeping reform was needed. Maximum benefit could not result from co-operation of undertakings, if they retained independent management of their local power stations, as each undertaking would naturally consider its own interests first, irrespective of the effect on neighbouring authorities.⁶² The experience of London could serve as a warning, where the existing authorities had announced their intention to link up and put forward a good scheme, whenever proposals were made for "super-power station" schemes, but where every time the alarm subsided, the efforts to combine subsided as well.⁶³ For this reason, the Williamson Committee suggested that reorganisation should be based on single public ownership, by district boards, of generating stations and transmission systems.⁶⁴ The I.M.E.A. on various occasions expressed the view that a national system required the amalgamation of companies and local authorities and that joint boards would become cumbersome, especially in the case of larger areas. A somewhat loose association of independent undertakings with divergent interests was not likely to act with the same speed as a new body created specially to take vigorous action.⁶⁵

(a) *District Boards*

The constitution of such a district board was a matter of greatest importance and aroused considerable controversy. The idea of dual control in mixed undertakings proposed in the 1914 L.C.C. scheme had lost some of its attraction, and discussion tended to

⁶⁰ Chairman's Address, *J.I.E.E.*, 58 (1920), p. 49.

⁶¹ *Eng.*, 125 (1918), p. 493.

⁶² *El. Rev.*, 82 (1918), p. 319.

⁶³ *El. Times*, 49 (1916), p. 428.

⁶⁴ Williamson Report, *loc. cit.*, s. 37.

⁶⁵ Cf. *I.M.E.A. Proc.* (1918), p. 35.

favour the creation of a single authority whose functions would comprise both management and ownership of electricity supply. The Haldane Report visualised a development in some districts of public and in others of private bodies, but municipal circles, such as the Incorporated Municipal Electrical Association, and the Association of Municipal Corporations (A.M.C.) claimed that "it would be a fatal mistake to depart from the principle . . . that undertakings of this description which involve a monopoly, . . . should be entirely in the hands of public authorities."⁶⁶ They went so far as to demand boards wholly independent of the influence or control of commercial enterprise and consisting of local authorities and large consumers to the exclusion of companies, except in the case of London and the North-east Coast, where the importance of the private interests demanded special consideration. The private undertakings should be acquired on fair and equitable terms.

A complete elimination of the electric supply companies had probably little prospect of acceptance by Parliament, private interests had to be granted appropriate representation on any electricity board. The Williamson Committee insisted that the new boards should be publicly owned and recommended that authorised undertakers, whether municipalities or companies, should be represented on the new boards; they might also include representatives of large consumers and local authorities which were not authorised undertakers. In every case the size of the board should be as small as possible. The actual constitution of the boards was to depend on the manner of financing the undertaking and the Committee suggested that this could be arranged either nationally with Government funds or locally with local interests subscribing the necessary capital.

The proposed district boards would acquire the generating stations and main transmission lines of the existing undertakings, erect new ones and make arrangements to link them up and develop supply under the direction and financial control of the Electricity Commissioners.⁶⁷ The existing authorities would have to take supply from the boards and would only retain retail distribution for themselves.

Whilst the Committee insisted on public ownership for each district, it did not call with the same emphasis for public operation

⁶⁶ Printed in *Garches's Manual*, XXII (1918-9), p. 20.

⁶⁷ Williamson Report, *loc. cit.*, ss. 39, 46, 50.

of the undertakings. It considered the alternatives of public operation and lease to a company, and proposed to leave the decision to the District Electricity Board itself, subject only to the approval of the Electricity Commissioners.⁶⁸

The scheme as sketched above was designed to combine the essentials of active reorganisation, namely central planning and control, with considerable regional autonomy and respect for existing interests. The recommendations of the Williamson Committee were adopted in the Electricity Supply Bill of 1919, and will be more closely discussed below. The strongest opposition came from the circles which advocated voluntary reorganisation and which used increasing pressure to frustrate any comprehensive scheme, but there was also a small minority which claimed that the Williamson Committee's proposals would sacrifice progress by excessive concern for existing interests.

(b) *Nationalisation Proposals*

The Birchenough Committee called the variety of organisations proposed wholly unsatisfactory, as it would militate against the uniformity of administration necessary for a well-thought-out system of national development,⁶⁹ and they were not alone in stressing the need for a development on identical lines for the whole country.⁷⁰ They expected that the responsibility of the local ratepayer for the final results of the district boards would necessarily involve the system in the intricacies of local government areas, which were to a large extent the cause of previous shortcomings. On the other hand, in the case where national financial assistance was invoked, "public funds would be committed only to the development of the commercially least promising areas, with the result that grants made by the State for this purpose would be in the nature of doles to backward areas rather than co-operation in a comprehensive scheme on a scale and under conditions which might reasonably operate to the financial advantage both of the nation at large and of the local community."⁷¹

It was "essential that, for efficient management, a business of this nature should be concentrated in a small number of hands

⁶⁸ *Ibid.*, s. 46.

⁶⁹ Birchenough Report *loc. cit.* 85.

⁷⁰ Mr. R. A. Chatto k, *Proc. I.M.E.A.* (1918), p. 50.

⁷¹ Birchenough Report, *loc. cit.*, s. 5.

with high commercial and technical qualifications, and such a body of management could not reasonably be expected to result from the system of electoral bodies indicated in the (Williamson) report." For this reason, they would favour the concentration of the industry in a public utility company, were it not for the strong and irreconcilable public and Parliamentary opposition to any transfer of municipal undertakings to private concerns. The superior efficiency of a company, due to its profit incentive, would in any case be lost by any limitation of dividends on which Parliament would insist as a safeguard of the consumers' interests.

The Birchenough Report expressed the fear that a system of finance as indicated in the Williamson Report would lead to a development much too slow and uneven to keep pace with the possibilities of demand at the end of the war. They therefore reached the conclusion "that any comprehensive and efficient system must not only be a national system, but a single unified system under State regulation,"⁷⁸ financed by the State but conducted on commercial lines. The admittedly high cost of acquiring all existing private and municipal undertakings was not considered prohibitive in view of the issues involved. Although these recommendations for the complete nationalisation of the industry were never seriously considered, they foreshadowed in a tentative way a solution which gained great importance later on, namely the constitution of a public corporation combining national ownership and control with extensive commercial autonomy.

IV. CONCLUSIONS

During the first world war electricity had at last been given an opportunity, when put to the test, of showing its usefulness in practically every field of activity, and had thus become an indispensable factor in the industrial life of the nation. It seemed destined to play an equally important part in post-war Britain and fully deserved the attention devoted to its organisation.

Electrification on a national scale could only be achieved by a better organisation and central direction of the industry. There seemed to be complete agreement on the outlines of development with only differences in degree as to the extent of compulsion and central control necessary to ensure success. In the light of later

⁷⁸ *Ibid.*, s. 9.

experience, it may appear difficult to believe that the trust in voluntary co-ordination was genuine, and not a ruse to ward off any attempts at legislation designed to introduce an effective control of the industry. No conscious effort to wear down public opinion and whittle away the essence of reorganisation could have been better planned.

Be that as it may, the recommendations of the Williamson Committee contained a practicable solution, combining the necessary minimum of central control and direction with a maximum of regional autonomy and freedom of individual development. Their proposals had every prospect of acceptance at a time when planned reconstruction was in the forefront of people's thoughts. Whether the hope would be justified that the old antagonists, the local authorities, distribution and power companies, would work happily and efficiently together under the common cloak of a District Electricity Board, depended on the team spirit with which these new bodies could be imbued and the power of positive control exercised by the Electricity Commissioners.

It will be the task of the next chapter to examine how the post-war reaction against any government control and the lapse back into the old *laissez-faire* attitude strengthened the interests concerned more with the maintenance of their own powers than with the progress of the electrical industry.

CHAPTER VI

ATTEMPTS AT REGIONAL REORGANISATION

I. THE POLITICAL AND ECONOMIC BACKGROUND

ELECTRICITY was only one of many problems which, during the war, had been subjected to careful scrutiny by committees supported or appointed by the Ministry of Reconstruction. Their activities comprised finance, transport, production, commercial and industrial organisation, rural reconstruction, health, housing and education. Reports, White Papers and pamphlets had poured forth "surprising in range and wisdom, in scope and variety, intelligent, imaginative and practical."¹

Industrial leaders, whilst admitting the necessity for many radical changes, considered a swift return to active industrial life even more important. The more nearly conditions resembled those of pre-war days, the quicker, they hoped, would be the recovery. Government control of manufacturing industries should cease as soon as possible, although in certain key-industries it would have to continue for some time. This point of view was apparently accepted by Sir Albert Stanley, the Secretary to the Board of Trade, and Dr. (now Lord) Addison, the Minister of Reconstruction.²

At the General Election immediately after the war the government launched its campaign with a noble appeal for national reconstruction, but "homes for heroes" failed to interest the electorate, which was "convulsed in a rare mood of vindictive passion, strengthened rather than assuaged by the new women voters."³ The government was accused of being in far too great a hurry to fulfil what they

¹ Elisabeth Denby, *Reconstruction, 1916-1941*, *New Statesman and Nation*, 3-5-41, p. 454.

² *Engineer*, 126 (1918), p. 41.

³ H. L. Fisher, *History of Europe* (1936), p. 1163.

imagined to be the expectation of the electorate with regard to reconstruction,⁴ and the pressure of opinion forced them to lay more and more stress on the punishment of the enemy instead of reconstruction at home. *The Times*, in a leader on December 8th, declared that the public mind was still bewildered by the Prime Minister's various statements, and that there was a suspicion of influences in favour of letting the Germans off lightly. In his final manifesto Mr. Lloyd George capitulated and promised vindictive measures with fullest indemnities from Germany.⁵ If the statement quoted by Mr. (now Lord) Keynes is correct, namely that the new House of Commons consisted of a lot of hard-faced men who looked as though they had done very well out of the war, and who, in the majority, had pledged themselves much more than the Prime Minister in regard to making the Germans pay,⁶ the fate of the reconstruction schemes becomes understandable.

Business circles were never in favour of State intervention and control, and the mistakes that had been made during the war only strengthened their antagonism to centralisation. To quote again Mr. Keynes' book, which has proved so prophetic in many respects, "in England the outward aspect of life does not yet teach us to feel or realise that an age is over, we are busy picking up the threads of our life where we dropped them, with this difference, that many of us seem a good deal richer than we were before."⁷ By contrast with the war experience, the pre-war era of stability and rising standards of living appeared desirable to employers and workers alike, with the result that there was little opposition to the demands for a return to "normal conditions," to "business as usual." The reform proposals made during the national emergency were quickly forgotten. The chances of reconstruction were further weakened by the fact that so many proposals were only tentative and that no machinery was ready to put them into effect immediately peace came; however, even where the government speedily introduced suitable legislation, the antagonism to radical measures was overwhelming.

The dropping of the Coal Bill in December, 1919, was "symptomatic of the legislative mess confronting Parliament,"⁸ and the

⁴ Mr. Marriott, *Parl. Deb.*, H.C., 5th Series, Vol. 123, 22-12-19, c. 1108.

⁵ Cf. J. M. Keynes, *The Economic Consequences of the War*, p. 130.

⁶ *Ibid.*, p. 133.

⁷ *Ibid.*, p. 2.

⁸ *Manchester Guardian*, 12-12-1919.

Electricity (Supply) Act of 1919, as we shall see, constituted very largely a victory of vested interests over wider national needs. The amalgamation of railways and banks, ending in the formation of giant private concerns, again was a triumph of "big business."

Unfortunately for all those who believed in *laissez faire*, life refused to become normal, the post-war boom ended in the summer of 1920 and led to a serious slump in trade and exports with the consequently increased burden of the outstanding debts crushing industry. Orthodox methods of financial retrenchment were tried against the depression, which lasted until 1923, and in which prices fell by over 50 per cent., adding further obstacles to any reorganisation.

"The insistent advocacy of restriction in national expenditure, of reduction in floating capital, the reduction of budget expenditure to a minimum . . . and with it the sidetracking of every scheme of national improvement requiring State subvention, the reduction of wages and of prices to a level below the economic level at which a normal state of trade would have kept them—all those combined to rob Britain of an immensely valuable advantage in the race for industrial supremacy in the world."⁹

The impact of these factors on the proposals for the unification of electricity supply will now be examined in more detail.

II. THE ELECTRICITY SUPPLY BILL, 1919

At the end of the first World War electricity had become indispensable as a source of light and power, and, following the slump after the Armistice, demand for electric power grew larger even than during the war itself. Restrictions upon demand and upon connection of new consumers had to be enforced in a number of places. In one or two cases appeals were made to the consumers to reduce their demand during the time of peak load; in others, such as Birmingham, it was necessary to resort to more coercive measures.¹⁰ It was obvious that to meet the increased demands new plant was urgently required.

In addition to the existing needs, electricity supply was expected to play an important part in general industrial reconstruction by counter-acting the over-concentration of population and industry,

⁹ H. Quigley, *Electric Power and National Progress*, 1925, p. 14.

¹⁰ *EL.*, 83 (1919), p. 741.

and reducing and simplifying the labour in the household.¹¹

To enable the electricity supply industry to do full justice to these important tasks, a thorough reorganisation was considered essential and the valuable investigations during the war gave clear indications as to the methods to be adopted. In spite of criticisms, the fundamental principles of reform seemed to be generally accepted, and in May, 1919, the Electricity (Supply) Bill was introduced, based very largely on the Williamson Report.

In view of later amendments, it is important to note the consistency of this measure. Electricity was acknowledged as a most important factor in national industrial development, which needed to be fostered and directed on national lines. As existing government departments were regarded as unsuited, central technical and financial control was to be concentrated in a new body of experts with wide powers, but under effective supervision of Parliament. This body was to be given the task of forming new regional executive authorities capable of carrying out schemes in the national interest, but with a maximum of regional self-government. The authorities, which would, to a large extent, consist of representatives of existing undertakings, were to take over generation and transmission, but to leave the business of retail distribution untouched.

In detail, the proposals combined insistence on central direction in essentials with a willingness to compromise, as far as possible, with existing interests.

(1) *The Electricity Commissioners*

The necessity of a central controlling body had been practically generally admitted during the war-time discussions,¹² and was (and remained) the undisputed corner-stone of the new legislative structure. Only a small minority of company interests demanded unfettered independence and wanted to confine the activities of the Electricity Commissioners to purely advisory functions.¹³ Thus, a *Times* leader warned that, in spite of the alleged intention not to exercise oppressively the power of control, experience would disprove this optimistic interpretation of the conduct of a centralised authority. To avoid the dangers of bureaucratic interference, it recommended a small permanent committee of experts with the

¹¹ Cf. J. R. Beard, Chairman's Address, N.E. Centre, *J.I.E.E.*, 59 (1920), p. 30.

¹² Cf. *supra* pp. 105 ff.

¹³ *El. Rev.*, 84 (1919), p. 686.

sole duty of conducting research, giving advice and stimulating co-operation.¹⁴

The establishment of the Commissioners was the only substantial advance eventually achieved by the early post-war legislation, which allotted to them the functions of promoting, regulating and supervising the supply of electricity.¹⁵ To ensure Parliamentary supervision, the five members were to be appointed by the Board of Trade (later by the Ministry of Transport in consultation with the Board of Trade),¹⁶ two for a definite period fixed by the Government, and the others "during His Majesty's pleasure." The majority of the members "shall be selected for practical commercial and scientific knowledge and wide business experience, including that of electricity supply"; no Commissioner to have any interest in an electricity undertaking.

The original Bill granted the Electricity Commissioners far-reaching executive powers to effect the reorganisation of the industry; it was to be their first duty to plan and carry out the reorganisation by determining electricity districts and constituting District Electricity Boards by special order, after holding local enquiries. The constitution and functions of the boards were clearly circumscribed, and it was hoped that the Commissioners could concentrate on the technical details of the scheme. After the formation of the district boards the Commissioners were to have the right of giving directions as to the exercise and performance of their powers and duties (Sec. 6). In addition, no existing undertakers could establish new or extend existing stations without their consent (Sec. 9). Finally, they were empowered to conduct research and experiments for improvement in the methods of electricity supply or the utilisation of fuel and water power (Sec. 3).

The considerable powers of control held by various government departments, such as the Board of Trade, Local Government Board, Home Office and L.C.C., were generally to be delegated to the Commissioners, except special functions, such as the regulation of prices, the granting of compulsory way-leaves, arbitration, and the revocation of electricity supply licences, all of which were reserved for the Minister of Transport.¹⁷ The Commissioners were

¹⁴ *The Times*, 27-11-19.

¹⁵ *El. (Supply) Act*, 1919; 9 and 10 Geo. V. ch. 100.

¹⁶ *Now Minister of Fuel and Power*.

¹⁷ *Cf. El. Com. 1st Annual Report*, 1920-21, p. 14.

to settle any disputes between the newly-formed District Boards and the existing undertakers (Sec. 8).

A third category of functions imposed on the central controlling authority had the object of ensuring that the consumers benefited from the reorganisation of the industry. The Commissioners were to have the right of requiring undertakers to give reasonable facilities of supply, and if they did not comply their undertakings could be transferred (Sec. 14) ; they could, on the application of the District Boards, exclude from a power company area any part which had no supply and which could be better served by the District Board ; on the other hand, they could authorise power companies to supply also for lighting purposes in those sections of their area which were without an authorised distributor (Sec. 13). As a first step towards unification and standardisation of supply, they could require alterations in the system of supply of existing undertakers (Sec. 26).

The extent of the functions allotted to the new central authority was aptly described by the Home Secretary during the second reading of the Electricity Bill when he stated that, through the regional bodies, the Electricity Commissioners would have the controlling power over the whole of our electricity supply policy.¹⁸

(2) *Technical Reasons for Regional Generating Bodies*

It will be noted that the Electricity Bill did not empower the Commissioners to build generating stations nor to engage in the business of electricity supply themselves. Nationalisation, the policy advocated by the Birchenough Committee, had little support in Parliament, and would probably generally have been considered too revolutionary. The Bill adopted the recommendation of the Williamson Committee to form new regional bodies, each comprising the areas of a considerable number of the existing 438 undertakings.

A reorganisation on regional lines was technically attractive. Mr. J. R. Beard considered the dense population and relatively small area of Britain very favourable to the electrification of industry, as they lowered the cost of distribution. There was no need for extensive long-distance transmission, since the long coast line, frequent rivers and the widely-distributed coalfields made it economical to generate the main requirements in each area without

¹⁸ *Parl. Deb.*, 5th Series, H.C., v. 115, 14-5-19, c. 1630.

serious need for high-capacity inter-connection between them.¹⁹ It is interesting to note that 20 years later, in his Presidential Address to the "Institution," he revised his views and stated that the technical development of industry in the intervening years (up to 1925) had shown that maximum efficiency of generation required planning on a national rather than regional basis.²⁰

Pitheads had for a long time been considered the most economical sites for generating stations, but engineers became more divided amongst themselves as to the policy to be followed than they were a few years before.²¹ Increasing fuel economies were achieved by special treatment of coal and higher working temperatures made an adequate supply of condensing water a factor of outstanding importance. Canals were unsuitable and cooling towers were considered costly and inefficient by many engineers. The use of tidal rivers, recommended in the Haldane Report, was restricted to a few areas which were not often geographically the best from a power supply point of view. Increased costs of construction and of transmission lines rendered the case for super-stations and the scrapping of existing plant less favourable; indeed, Robertson thought it extremely difficult to make out a case for supply from super-stations 8 or 10 miles away when fairly modern plant was in existence.²² As the capital charges in the London area, even before the war, amounted on the average to no less than 50 per cent. of the total price of electricity to the consumer,²³ the closing down of small stations could rarely be justified on the ground of economy to the local users, so long as the capital charges of the superseded station had to be borne locally.

A regional grouping of local stations in conjunction with one or more large-scale plants was thought likely to lead to the most satisfactory results, as it would allow for a careful examination of local conditions.

(3) *The District Electricity Boards*

The authorities which were to be responsible for the regional reorganisation of the generation of electricity and to take charge

¹⁹ J.R. Beard, *J.I.E.E.*, 59 (1920-1), p. 31.

²⁰ *J.I.E.E.*, 88 (1941), p. 25.

²¹ J. A. Robertson, *J.I.E.E.*, 58 (1919-20), p. 48.

²² *Ibid.*; cf. *El. Times*, 55 (1919), p. 341.

²³ *London and Home Counties El. District: Report on proposed technical scheme by Engineering Committee, London, 1921*, p. 5.

of wholesale supply, were the District Electricity Boards to be created by the Electricity Commissioners in accordance with the rules laid down in the Bill. The Act of 1909 had facilitated concentration of generation, the taking of bulk supplies by the existing distributing undertakings, and joint action of local authorities, but its purely permissive clauses had been largely ignored and parochial pride had refused to join hands with neighbours merely in the interests of economy. The new legislation intended to enforce concentration, where desirable, by authorising the compulsory formation of District Electricity Boards. The clause was, however, not mandatory and Sir A. Williamson drew attention to the danger that the Commissioners might decide not to set up District Boards in all parts of the country, and thereby destroy the unity of the scheme.²⁴

The establishment of an authority super-imposed on the existing undertakings necessarily carried a serious risk of friction which could, however, be minimised if the existing authorities had a share in the control and a financial interest in the success of the new body. Just as in a co-operative society the members profit by the association, so it was hoped that the various undertakers would appreciate the advantage of reorganisation and willingly work together.

The Electricity Bill, therefore, provided that the members of the Board should be representatives of local authorities, companies and persons who were authorised undertakers within the district, also of large consumers, labour, and those local authorities which were prepared to give financial assistance without being undertakers themselves (Bill Sec. 5).

The exact constitution of the Boards was left to the Electricity Commissioners, but the majority of representatives were to be elected by the existing undertakers in proportion to their relative strength. In consequence, a considerable diversity of character could be expected, especially as the functions of the boards could be delegated to any authorised undertaker or company with the agreement of the Commissioners (Sec. 16). A body comprised of representatives of various and frequently divergent interests is in great danger of being paralysed and incapable of reaching decisions, unless it succeeds in creating an independent team spirit amongst its members, to put the common interest first and subordinate

²⁴ *Parl. Deb.*, 5th Series, H.C., Vol. 113, c. 1656.

sectional interests and prejudices. The chance of success is the greater the more independent the new authority is from the direct influence of its constituent parties. District Boards were to be established by the Electricity Commissioners and to remain under their close supervision; their functions were clearly defined and were sufficiently important to engage the attention, and probably the enthusiasm, of their members. Against all these favourable factors, the fact remained that the members of the Boards were directly accountable to sectional interests and had to submit from time to time to re-election by them.

Mutual tolerance and goodwill was obviously an essential condition of success, and these qualities were frequently absent. Local authorities were unwilling to grant private interests any share in the control of the new Boards, the I.M.E.A. Council demanded that the District Electricity Boards should, in all cases, be independent from the influence of private electrical concerns, that they should consist of representatives of local authorities and large consumers to the exclusion of companies generating or distributing electricity.²⁵

This was certainly not the intention of the Bill which, with the creation of the District Boards, had the purpose of joining the private and municipal interests in one body. The proposed three-tier structure with the national body of Commissioners, regional boards and local distribution undertakings undoubtedly opened the gate to friction and obstruction: "District Boards may prove to be a thorn in the side of the Electricity Commissioners, throttling their policy and asserting their own independence, and on the other hand cramping the distributors and gradually driving them to sell out."²⁶ The over-riding powers of the Commissioners, however, and the clear-cut functions of the boards placed the powers firmly in the hands of the wider authorities and minimised the possibility of obstruction from local interests. If there was any chance of co-operation, the Bill justified the hope of success.

(a) *Functions of District Boards*

The main task of the District Boards was to carry out the policy underlying the Electricity Bill, to provide or secure a cheap and abundant supply of electricity (Sec. 6) on a non-profit making basis.

²⁵ *Proc. I.M.E.A.* (1919), p. 121.

²⁶ *El. Times*, 35 (1919), p. 360.

All generating stations and main transmission lines were to be vested in the Boards (Sec. 7), which were thereby enabled to concentrate production and reduce costs. Cheapening of production, however, would not ensure in itself a speedy and general development of electricity supply and the Bill made special provisions to further this aim. The District Boards were to be responsible for electricity distribution as well as generation in their whole area, and had the task of concentrating their attention on neglected districts. They could not generally interfere with the rights of existing undertakers, except with their consent, but on the recommendation of the Commissioners, the Board of Trade could dispense with this consent in the interest of efficiency (Sec. 11). The boards could further apply to the Commissioners to take other action for the benefit of the final consumer.²⁷

No doubt it was the intention of the Bill for the District Boards eventually to be the only electricity authorities. They were to take over the purchase rights of local authorities and to exercise them at the first opportunity, except where the Electricity Commissioners consented to a postponement. Even before that date they could acquire company and municipal undertakings by voluntary agreement (Sec. 12). The structure of the electricity supply industry visualised in the Bill was the creation of a small number of regional authorities in charge of all branches of electricity supply. Whilst for a considerable time to come private and municipal interests would be predominant, after the absorption of the companies, the control would be public, partly regional and partly local. Even looking ahead a great number of years, the Bill could not, therefore, be termed a "nationalising scheme."²⁸

(b) *Purchase Terms*

The contemplated transfer of all generating stations to the new District Boards raised the difficult problem of compensation. In the original Bill different treatment was proposed for public and private undertakings.

To local authorities the Bill provided for the payment of a "standard price," namely "annuities of such amount and period required to indemnify the local authorities against their liabilities for interest and sinking fund charges for capital borrowed for

²⁷ Cf. *supra*, p. 118.

²⁸ *El. Rev.*, 85 (1919), p. 6.

electricity purposes." If it could be proved that a substantial part of the cost had been defrayed from revenue, the Electricity Commissioners might authorise an increase in the price (Sec. 7).

There was considerable opposition to this proposal on the grounds that, owing to the operation of sinking funds and the increase of values, the generating stations were worth considerably more than the standard price.

Mr. J. A. Robertson examined these criticisms and pointed out that, as a rule, local authority generating stations had redeemed not less than 40 per cent., and often 60 per cent., of the original capital expenditure, that the value of plant had increased by 2-2½ times over the pre-war prices, and that, therefore, the regional authorities would make a very good bargain, if they paid the terms suggested in the Bill.²⁹ The proposal had the disadvantage of not distinguishing between prudent and imprudent authorities ; in effect it penalised the former. On the other hand, as local authorities were not traders for profit, but were out to ensure a cheap and efficient supply for the community, he claimed that they would reap the benefit of a low purchase price for their generating stations by way of reduced charges.³⁰

He was of the opinion that companies were in a different position, as they had invested capital with a view to making money and had had Parliamentary sanction to do so. The local authorities themselves did not admit such a distinction ; the I.M.E.A. and the L.C.C. claimed that compensation should be identical for local authorities and companies,³¹ and the Association of Municipal Corporations demanded payment for the actual value of the station in every case, or at least for the original cost less depreciation, without distinction between public and private undertakings.³²

The Amendment Bill introduced into the House of Commons accepted this claim for equality of treatment and allowed the alternative of a capital sum calculated in a like manner and on a like principle as in the case of companies, namely original cost of construction less depreciation, certified by an auditor appointed by the Electricity Commissioners (Sec. 7). Although, in the interest of cheap generation, the lowest possible compensation to the owners

²⁹ *J.I.E.E.*, 58 (1920), pp. 48 ff.

³⁰ *Ibid.*, p. 50.

³¹ Cf. *El.*, 83 (1919), p. 632.

³² *El. Times*, 56 (1919), p. 24.

of supply stations was desirable, the claim of the local authorities for equal treatment appears to be well founded. A cheap purchase price to the District Boards would not necessarily benefit the ultimate consumers, but the distributing authorities taking bulk supply, and equal compensation appears more equitable than a scheme which would in effect favour company shareholders or a careless local authority.

There was very strong opposition to this proposed basis of compensation, Sir Frederick Banbury and other members of both Houses of Parliament calling it a "breach of faith."³³ Companies would be doomed to extinction by methods which were hardly removed from fraud; as the plant was then worth twice its original value, the return of the capital outlay in terms of a depreciated currency "amounted to robbery."³⁴

It will be remembered that the Act of 1888 had provided for the payment of the "then value" of all lands, buildings, etc., used for the purpose of the undertaking, i.e. the replacement cost at the time of the compulsory purchase. If these terms were applied in 1919, the companies would derive a windfall benefit from the existing high level of prices. Most purchase rights, however, were not yet exercisable, and would not come into operation until 1930 and after. The critics of the Electricity Bill argued from this that the prices for the immediate purchase of generating stations ought to be more favourable to the companies than those to which they would be entitled at a later date.³⁵ The justice of this claim cannot be denied, but there was no guarantee that the price level would remain stable until the actual purchase date. The terms of compensation laid down in the 1888 Act were subject to very severe fluctuations both in the market value of equipment and of the general price level, and it was quite impossible in 1919 to foresee the actual price which would have to be paid 12 years hence. The new purchase terms based on the original cost of the equipment had the advantage that they avoided violent fluctuations of prices and could be established in advance by simple accounting methods. Payment of the original capital investment, less depreciation, appears to be the fairer method of compensation, although it does not allow for variations in the general price level and, therefore, imposes on the

³³ *Parl. Deb.*, 5th Series, Vol. 121, c. 1510.

³⁴ *El. Rev.*, 86 (1920), p. 545.

³⁵ *El.*, 86 (1920), p. 194.

undertaking the same risk which is borne by holders of fixed interest securities. The main difficulty was to establish the original cost, especially if a part of the capital expenses had been paid out of revenue.

Had the new terms been proposed a few years later, during the heavy post-war depression, they might have been greeted as a constructive and helpful gesture to the companies ; at the height of the 1919 boom they caused severe ill-feeling.

As a concession to the companies, the clauses were amended in committee both as regards the actual payment and the regulation of the standard price : an auditor appointed by the Board of Trade was to hear the interested parties and certify the cost of lands, buildings, works, material and plant, in use for the purpose of the undertaking, together with expenses of construction and acquisition of the site, less depreciation, but with the addition of a compensation for the damage sustained due to the severance of the station from the undertaking (Am. Bill, Sec. 7).

The technical press, which had objected to the original clause as seriously crippling the companies, greeted the amendment as a very satisfactory way out.³⁶ On the other hand, the companies were still not satisfied ; they seemed to forget that only generating stations and main transmission lines were to be taken over and that they had a guarantee of bulk supply for distribution purposes on terms no less favourable than if they generated electricity themselves. A memorandum of the Provincial Electric Supply Committee to the House of Lords claimed that the cost of generation was steadily reduced by improvements and that to deprive the companies of the opportunity to make further improvements was to deprive them of part of the goodwill of their undertakings during the tenure guaranteed by Parliament.³⁷ However, even greater economies were likely to result from concentration and co-operation of generating stations from which sooner or later all undertakers were bound to benefit. A specially favourably placed company might be able to reduce its costs if it remained independent, but even so the transfer of the generating plant to District Boards meant no real sacrifice, as many factors making for lower costs (such as general industrial development, growth of population, etc.) were due

³⁶ Cf. *El. Rev.*, 85 (1919), p. 579.

³⁷ Quoted *El. Times*, 56 (1919), p. 445.

to outside influences independent from any efforts of the companies.

In some cases an undertaking might be deprived of its reward, but, if vested interests were compensated as fully as to provide for even exceptional conditions, the prospects of "cheap electricity" for the community might have suffered.

The problem was to find a fair compromise between a compensation based on fictitiously low values, and one which would mean a heavy burden for the District Boards. The purchase terms of the Amendment Bill appear to have been satisfactory, although undoubtedly at the time they seemed less favourable to the companies than the terms in the 1888 Act.

Companies unwilling to purchase electricity from the District Boards could demand the acquisition of their entire undertaking on very advantageous terms: authorised distributors against payment of the capital cost of the whole undertaking, without any reduction for depreciation (Sec. 12 (4)), power companies at the fair market value of their whole undertaking, including subsidiary companies as going concerns (Sec. 13). The methods of compensation adopted were probably those most favourable to each class of undertaking.

(c) *Finance*

Transfer of existing plant, construction of new stations and transmission lines demanded large sums of capital. As all these expenses would be part of a national scheme of reorganisation, the Williamson Committee had recommended that they should be mainly borne by the National Exchequer and that only supplementary costs should fall upon the regional bodies. In this way the most favourable terms could be obtained and the uniformity of development ensured, although the efficiency of the District Boards would be enhanced by allowing the constituent parties some financial interest in their success.

The government was not prepared to undertake any financial responsibility for the electricity scheme and explained through the Home Secretary that, having regard to the financial position of the country, it was wiser that each district should be responsible for its own finance.³⁸ Sir Archibald Williamson seriously criticised this attitude and expressed the fear that reliance on local authorities would cause delay and lack of uniformity.³⁹

³⁸ *Parl. Deb.*, 5th Series, Vol. 113, 17-3-19, c. 1632.

³⁹ *Ibid.*, c. 1639.

The Bill granted District Boards the power to borrow money for capital purposes and also for working capital during the first three years of existence, subject to the approval of the Commissioners (Sec. 30), either by the issue of stock or otherwise (Sec. 31); authorised undertakers and the Boroughs and County Councils in the area were permitted to lend money or give other assistance to the Board (Sec. 32). Only in the case of urgent work and under special circumstances could the Commissioners grant direct loans to District Boards, subject to the approval of the Treasury and only up to a total of £25 millions (Sec. 33). To encourage the immediate construction of generating stations, even prior to the constitution of District Boards, the Board of Trade could make advances up to £20 millions, which the regional bodies would have to repay at a later date (Sec. 19).

These financial clauses formed a vital part of the reorganisation and became, therefore, the obvious target for a furious attack by the opponents of the proposal.

The opposition was first of all directed against the alleged enormous expense to be incurred by the taxpayer on schemes which at best would not be self-supporting for a number of years and which, in the case of failure, might become a permanent burden to the public. This was thought to be unbearable at a time when the public debt had already reached astronomical figures as a result of the war. In the debate in the House of Lords, Lord Moulton referred to the "crushing weight of debt" and the difficulty of finding money even to carry on the necessary machinery of government. In these circumstances, was it a wise policy for the government to take a large and widely diffused industry out of private hands, capable and prepared to take the necessary risks, was it a wise policy to spend countless millions on schemes which could only take effect years hence?⁴⁰ Concern for the pocket of the taxpayer was also the keynote of articles and reports published in the daily Press.

The situation is reminiscent of the drive against municipal electricity supply at the turn of the century, when also any investment was branded as a debt without regard to the substantial assets accruing on the credit side of the balance sheet. Apart from new building (which will be examined presently) expenditure by the District Boards would have consisted mainly of the purchase of

⁴⁰ *Parl. Deb., H.L.*, 3-12-19, Vol. 37, c. 577.

existing stations. Assuming that the various new regional bodies were to be financially self-sufficient, the existing undertakers would contribute the major portion of their capital; it is, therefore, unlikely that the responsibility of the public either as taxpayers or ratepayers would have substantially increased. It should be further remembered that of a capital expenditure on land, buildings and generating plant of approximately £48 millions, as much as £30 millions had already been expended by local authorities.⁴¹ The maximum liability of the taxpayer was limited to the £25 millions, over which the Electricity Commissioners could dispose, and at most another £20 millions which might be required for the immediate building of generating stations. The urgency of State action on this moderate scale was so obvious that even the final Act of 1919 (in which all other financial powers were eliminated) retained the authorisation for spending £20 millions.

A further argument against the financial provisions of the Bill was that it encouraged expenditure on new generating and transmission plant. The aim of legislation was undoubtedly more far-reaching than the mere transfer of ownership and linking-up of plant; in fact, the construction of capital stations for each district was an essential part of the reorganisation programme. The inflated costs of capital, material and labour in the immediate post-war period rendered the economic case for new large-scale generating stations less attractive when compared with existing stations and, as already stated, it was considered extremely difficult to make a case for new super-power stations 8 or 10 miles away when a fairly modern plant was in existence.⁴² In view of the higher cost of construction, it was no doubt advisable to retain obsolescent plant for a longer period than would otherwise have been economical, and the reorganisation of electricity was, therefore, likely to be only gradual.⁴³ From this simple fact the opponents of the Bill drew wide and sweeping conclusions. It was claimed that for ten years or so to come the money market must belie the efforts even of the most brilliant reformers; nothing but the resurrection of normal conditions could justify anyone in discussing super-stations.⁴⁴

⁴¹ *El. Com. 1st Annual Report, 1920-1*, p. 8.

⁴² *J.I.E.E.*, 58, p. 48.

⁴³ *Cf. El. Com., loc. cit.*, p. 14.

⁴⁴ *El. Times*, 59 (1921), p. 525.

The argument had force as long as sufficient plant was in existence to satisfy all demands for electric power in the near future. In reality, however, this was by no means the case. As already shown, restrictions had to be introduced in many places to adjust demand to existing conditions, and it was clear that a considerable proportion of the plant used during the war could not remain in service for very much longer. New construction on a substantial scale was, therefore, imperative. The problem was whether many independent stations or a few interconnected large units should be erected. Extension of plant would have to take place soon, and the same high prices would have to be paid for new construction by the existing undertakers as by the regional boards. On the contrary, by the concentration of plant, the use of larger sizes and linking-up, the capital outlay would probably be reduced to a minimum and the cheapest possible supply could be given. The question was not one of whether to spend £100 million of public money; it was rather of ensuring that the money which must be spent in any case was spent to the best advantage.⁴⁵

Would local stations on restricted sites with limited condensing facilities be able to meet all future demands? J. A. Robertson considered the erection of a small new station other than for reserve purposes unthinkable unless under the most exceptional circumstances.⁴⁶ It was not regarded as sufficient for the local station engineer to be able to show that a case could be made out for the continuance of a particular plant on commercial grounds, the wider aspect of fuel conservation would have to be taken into account, as the waste of coal with inefficient machinery could never be recovered. The argument that it was right to extend existing stations, whilst it was wrong to complete new ones, was not logical and savoured rather of bias than of sound judgment.⁴⁷

Undoubtedly, the construction of large capital goods is not always opportune. Although with stable prices the cost of extensions and small plants would eventually far exceed that of a comprehensive super-power scheme, in some stages of the trade cycle it would be unwise to embark on large-scale capital expenditure. At the height of the boom, for instance, when capital is scarce and the cost of labour and goods has risen to inflationary heights, con-

⁴⁵ *Loc. cit.*, 56 (1919), p. 459.

⁴⁶ *J.I.E.E.*, 58 (1920), p. 52.

⁴⁷ *J.I.E.E.*, 59 (1921), p. 56 (H. Dickinson).

ditions are unfavourable and new stations would be burdened with excessive capital costs which may affect the price of electricity. Extension of existing plant, even though it would be only a temporary expedient, may be more economical. On the other hand, it is of the utmost importance to make use of periods of depression with cheap capital and low prices, for the initiation of large-scale investment schemes.

Authorities are needed with powers of planning ahead on a long-term policy of construction, ready to seize the opportunity of development. It would be easy to prevent them from hasty expenditure by requiring the approval of a controlling body, such as the Electricity Commissioners.

The boom of 1919 (which broke soon enough in the summer of 1920) was, therefore, no valid reason for opposing the grant of financial powers to the District Boards, but the bog of colossal risks frightened uninformed opinion sufficiently to enforce a fatal weakening of the proposals.

III. THE REJECTION OF COMPULSORY POWERS

(1) *The Introduction of the Joint Electricity Authority*

The Electricity Bill of 1919 proposed to equip the boards charged with the reorganisation of the electricity supply industry with powers to enforce the concentration and inter-connection of generating stations, and experience in the past, especially the attempts at linking-up during the last years of the war, confirmed the necessity of compulsory powers. There was evidence that existing undertakers often preferred the *status quo*, and unbiased opinion tended to the conclusion that mere permissive powers would not be sufficient for creating a national supply system.⁴⁸ The House of Commons Committee considering the Bill was warned that it would be fatal to accept any amendment which would reduce the power of the Electricity Commissioners "to do things."⁴⁹ The hope was expressed that such compulsory powers would not be needed, but the threat of coercion was absolutely "indispensable, as in their absence the Commissioners would be reduced to a 'nerve-less figurehead.'"⁵⁰

⁴⁸ *El.*, 83 (1919), p. 113.

⁴⁹ *El. Rev.*, 85 (1919), p. 66.

⁵⁰ *Ibid.*, p. 770; *El.*, 85 (1920), p. 5.

For once, however, municipal and private electricity undertakers were united, claiming that the industry had not had a fair chance in the past owing to local restrictions and that the undertakers would be only too willing to come together to provide schemes for the best use of all undertakings.⁵¹ A committee representing the Federation of British Industries and the most important associations of electricity supply and manufacture, in conjunction with the Institution of Electrical Engineers, expressed the opinion that it would be impossible to deal directly with the task of reconstruction by means of general legislation, and recommended that immediate action should be confined to the creation of Electricity Commissioners with exclusively judicial and advisory functions. Strenuous objection was urged to the granting of administrative powers over electrical undertakings and also of authority to appoint District Boards in the event of such bodies being constituted. In fact, "the preparation of schemes, whether company, municipal or joint, should be left as a matter of free and natural development to the initiative of undertakers."⁵² Even Mr. George Balfour, one of the strongest opponents of the proposals, expressed the opinion that unification was in the interest of all the electricity supply authorities, but argued that they themselves would bring it about without having imposed upon them District Boards and State Regulation.⁵³

The plea was made in committee that with a slight modification of the Bill voluntary co-ordination could be given a chance, in default of which the full strength of the original national reorganisation scheme could become operative. It seemed a small and innocuous concession to make and the government accepted the amendment permitting the creation of Joint Electricity Authorities (J.E.A.) instead of the District Boards.

According to the Amendment Bill drafted by the Standing Committee B of the House of Commons, Joint Electricity Authorities could be formed by agreement amongst the various interests in a district and were to consist of representatives of the authorised undertakers with the addition, if desired, of representatives of the County Councils and other local authorities, large consumers and other interests in the district.

⁵¹ Cf. Statement of I.E.E., quoted *Garcke's Manual*, XXIII (1919-20), p. 18; *Mun. J.* 28 (1919), p. 809.

⁵² *Garcke, loc. cit.*

⁵³ *Parl. Deb.*, Vol. 113, 17-3-19, c. 1647.

The form and functions of the authority were only vaguely indicated, as the powers to be transferred were to depend entirely on the voluntary agreement of the undertakers; although they could be as comprehensive as those of District Boards, they might also be very much more restricted.

The procedure was also altered. The Commissioners had to consider first whether the existing organisation in a district needed improvement, and, if so, had to give the interested parties an opportunity of submitting a scheme of reorganisation and the formation of a J.E.A. (Sec. 5 (2)). If no satisfactory scheme was submitted, the Commissioners could themselves formulate proposals for the formation of a J.E.A. and only if they came to the conclusion that there was no chance for voluntary agreement, could they propose a scheme for the constitution of District Electricity Boards (Sec. 5 (3 and 4)).

(2) *The Disappearance of National Reconstruction*

It will be realised that the modifications of the Electricity Supply Bill just described were fundamental enough to give the whole scheme a new complexion. The original measure had intended to reorganise the industry from the top, with a central body creating and controlling regional boards, equipped with compulsory power to enforce the co-ordination of generation and transmission. The alternative body, the J.E.A., on the other hand, would be created by voluntary agreement of local bodies, flexible enough to be adapted to the needs of individual districts and to be influenced by the inter-play of local interests. No rigid rules as to constitution and functions stood in the way of free negotiations between the parties. The concession thus gave local undertakers and authorities the opportunity of working out their own salvation in a manner best suited for their purposes, but the threat of the compulsory creation of District Boards remained in the background and could be expected to act as an additional inducement to voluntary co-operation.⁵⁴

Assuming goodwill on all sides, a scheme based on mutual agreement could be expected to make the best possible use of local resources. There was, however, a danger in the preponderance of producers' interests, especially in areas where power companies

⁵⁴ *Mun. J.*, 28 (1919), p. 809.

were predominant. Even in the ideal case, each district would necessarily consider its own interests without regard to other areas and to the national welfare as a whole, and, if the idea of national development was to be a reality, close supervision by the Electricity Commissioners was more essential than ever. Obviously this would involve interference by the Commissioners with regional self-government. As the main purpose of the amendment was the strengthening of local influence, the danger of friction between the regional authority and the central body, minimised in the original Bill, became much more serious. If the Commissioners wanted to avoid endless conflict, they might be tempted to accept compromises which would prejudice the national development of electricity supply.

Apart from this disadvantage, the very elasticity of organisation permitted was likely to reduce the chance of a generally satisfactory agreement being reached with the local interests. In the original Bill all generating plant and main transmission lines were automatically vested in the District Boards, who would have no incentive to retain inefficient plant. A J.E.A. could leave the generating stations with the existing authorities, and no doubt the undertakers would use strong pressure to remain in possession of their plant and would insist on other advantages and privileges.

A certain tenderness for the *status quo* was accordingly inevitable and the formation of an Authority would be the occasion for hard bargaining, resulting in compromises which might render it an unwieldy and cumbersome body incapable of carrying out effectively the work of reconstruction.

Many years later Mr. Herbert Morrison expressed the opinion that even purely municipal Joint Authorities were not suitable for conducting huge business enterprises requiring day-to-day decisions. His own experience of Joint Authorities was that there was too much "joint" and not enough "authority" about them.⁵⁵ The dangers inherent in joint bodies of representatives elected by antagonistic groups of interests are the greater the more they are dependent on the goodwill and the co-operation of the constituent parties. The chances of success of a Joint Authority are likely to be smaller than would be the case with District Electricity Boards which would have big new tasks from the very beginning, under the powerful control of the Commissioners.

⁵⁵ H. Morrison, *Socialisation and Transport* (1933), pp. 123-4.

The later history of electricity supply in Great Britain shows how the ineffectiveness of J.E.As. as factors in the eventual reorganisation of the industry was at least partly due to this inherent weakness, and the McGowan Report considered it undesirable to set up further executive bodies constituted on an elective basis, and even recommended a review of the position of existing authorities.⁵⁶

The main difference between District Boards and J.E.As., it will be seen, lies in their relation to central control. Where originally the Electricity Commissioners would have planned the technical reconstruction and administrative reorganisation of a district with the local interests restricted to the right of criticism, the position was now reversed. The scheme for regional reorganisation would originate locally, and, whilst the Commissioners had the theoretical right of insisting on substantial modifications in the national interest, they would, for political reasons, have to accept compromise solutions.

In another respect new problems were raised by the introduction of the J.E.A. District Boards would have been public bodies on which the representatives of local authorities and consumers could be expected to safeguard the public interest, but no similar guarantee existed in the case of Joint Authorities. Major Barnes objected in Parliament to the proposal of giving purchase rights to a voluntary body which, in certain circumstances, might be entirely dominated by private enterprise.⁵⁷ This particular difficulty was, however, overcome by an undertaking of the government to insist on adequate representation of local authorities transferring their purchase rights to a J.E.A. (Sec. 13 (2)). The Commissioners established a rule that generally reasonable representation should be afforded to local bodies, important industries and railways.⁵⁸

IV. THE VICTORY OF THE STATUS QUO

(1) *The Ordeal in the House of Lords*

After careful consideration in November, 1919, the House of Commons passed the Amendment Bill which was sent up to the House of Lords for final approval. Quite unexpectedly strong

⁵⁶ *M.O.T. Rep. of the Com. on Elec. Distribution* (1936), s. 156.

⁵⁷ *Parl. Deb.*, 5th Series, Vol. 123, 22-12-19, c. 1114.

⁵⁸ *El. Com. 3rd Annual Report* (1922-3), p. 96.

opposition arose during the second reading and demanded the shelving of the whole scheme. No new arguments came forward against the Bill, but one speaker after another dwelt on the financial risks inherent in the proposals, on the imprudence of involving public credit in any sum of magnitude and destroying private enterprise at a time when it should have a free hand ; the nationalising tendency of the Bill would ultimately mean a big drain on the public exchequer.⁵⁹

Opposition in the House found strong Press support, grossly misleading figures were quoted "to stampede public opinion, which could hardly be regarded as *bona fide*" and were calculated to mislead the public.⁶⁰

In a leading article, *The Times* maintained that men of equal eminence and experience to those responsible for the reorganisation reports, considered that the proposed legislation would not cheapen electricity, and viewed with alarm the project of costly experiments which would extinguish private enterprise.⁶¹ The Provincial Electricity Supply Committee was in the forefront of the fight and contributed largely to the defeat of the Bill.⁶²

There could be no doubt as to the pressure exercised in opposition to the Bill, and moderate advisers recommended the acceptance of the suggestions by the I.E.E. Committee⁶³ to confine the Act to the appointment of the Electricity Commissioners. The Lord Chancellor, who was in charge of the Bill, after stating that most of the claims made by the Lords were based on ignorance of the conditions and of the Bill, admitted that in view of the opposition in the House, there would not be time to have the Bill passed at that stage. He therefore proposed that only the non-controversial portion of the Bill should be proceeded with immediately.⁶⁴ All compulsory powers for the establishment of District Electricity Boards, for the acquisition of generating stations, etc., and all the financial clauses, except Section 19, providing for the erection of emergency power stations, were eliminated. The government was at pains to stress that it did not accept the arguments of the opposition and still considered the jettisoned parts of the original Bill as

⁵⁹ H.L., *Official Report*, Vol. 37, 3-12-19, c. 577 ff.

⁶⁰ *El. Rev.*, 85 (1919), p. 737.

⁶¹ *The Times*, 18-12-19.

⁶² Cf. *El. Times*, 58 (1921), p. 254 ; *El.*, 83 (1919), p. 713.

⁶³ Cf. *supra*, p. 131.

⁶⁴ H.L., *loc. cit.*

essential. In fact, it pledged itself to re-introduce them during the next session.

(2) *The Electricity Act of 1919*

As a result of this substantial concession, the rump of the Bill was quickly passed and became law as the *Electricity (Supply) Act, 1919*.⁶⁵ The government's reason for allowing the reorganisation scheme to be thus mutilated was twofold. The creation of a new central authority for electricity supply was of the utmost importance, and could not be allowed to be delayed even for another year. On the other hand, the Act gave ample scope for the preparation of voluntary reorganisation schemes which could be equipped with the necessary financial powers by the passage of a supplementary Act during the next session. The success or failure of voluntary co-operation would also be a useful guide as to the extent to which compulsory powers would be necessary.

The Act, with one important exception, was again an enabling Act, relying on the co-operation of individual undertakers and without effective powers for enforcing a national reorganisation. The exception was the establishment of the Electricity Commissioners charged with the promotion, regulation and supervision of electricity supply (Sec. 1). The control of the electricity industry was at last unified in a central body consisting of five semi-independent experts; in addition the Commissioners had been given the particular task of furthering the national development of electricity by advising and even experimenting on their own. They had also the function of collating statistical information (Sec. 27), which proved invaluable for future development by establishing standards of comparison.

The Act rendered the Commissioners responsible to Parliament, not through the Board of Trade (whose staff was chosen and trained "for the purpose of supervision, of enforcing regulation and purposes which had the effect of curbing instead of encouraging enterprise"), but through the newly-created Ministry of Transport, which had "a suitable staff of highly skilled engineers and electricians."⁶⁶

The Commissioners' positive powers of reconstruction were severely curtailed: they could provisionally determine an electricity district and hold local enquiries; if the interested parties did not

⁶⁵ 9 and 10 Geo. V. ch. 100.

⁶⁶ Mr. Short (Home Secretary), *Parl. Deb.*, Vol. 121, 20-11-19, c. 1200.

submit a satisfactory scheme for effective improvements, and *where necessary*, for the formation of a Joint Electricity Authority, the Commissioners could formulate proposals themselves. They had no means of enforcing any scheme, except that they could require undertakers to give mutual assistance ; on a minor scale they could further future development by instructing undertakers to alter the type of current, frequency or pressure in the interest of standardisation (Sec. 24). They retained certain negative powers which strengthened their hands. Their consent was essential for any extension or new construction of generating plant, although they could only refuse after holding a local enquiry (Sec. 11). Joint Authorities were subjected to more extensive control and had to submit any scheme involving capital outlay for their approval (Sec. 17). Summing up, it may be stated that the Commissioners were powerless to enforce a development on national lines, but could at least prevent expenditure contrary to the national interest.

The only control over the constitution and functions of J.E.As. was the power of the Electricity Commissioners to determine the district, set a time limit for the submission of schemes and to approve the proposals, which would then be incorporated with or without modifications in an Order, requiring the approval of Parliament. Safeguards provided for the protection of the public interest gave also ample opportunities for obstruction, and under the most favourable circumstances considerable time was bound to elapse between the provisional determination of a district and the final approval of any scheme by Parliament.⁶⁷

The powers of retail distribution proposed for the District Electricity Boards⁶⁸ were taken over for the J.E.A. without substantial alterations, and were likely to assist the development of electricity supply. The Act further included certain clauses for the benefit of existing undertakers, such as Section 23, authorising local authorities to hire and maintain (but not to sell) electric fittings and appliances. It will be remembered that a more comprehensive clause had been eliminated from the 1909 Act owing to the opposition of electrical contractors.

(a) *The Reception of the Act*

The legislation of 1919 was widely welcomed as an important step forward, as a scheme which would enable electricity supply to

⁶⁷ *El. Com. 1st Annual Report* (1920-21), p. 16.

⁶⁸ Cf. *supra*, p. 122.

be built up on the work and with the co-operation of the existing authorities.⁶⁹ Mr. J. S. Highfield congratulated the House of Lords on forcing the Government to cut out a scheme "which would certainly have failed."⁷⁰ Even Mr. J. R. Beard, who had been strongly impressed by the necessity for reorganisation, considered the Act much more thorough and satisfactory than any electrical engineer could have hoped for previous to the war.⁷¹ Confidence was expressed that the gradual modernising of generation would be well done and that electric supply undertakers would co-operate even if only for the obvious reason that the failure of voluntary efforts would be followed by compulsion.⁷²

The approval of the Act was, however, not unanimous ; it was called a "shadow of its former self," due partly to the strong pressure of vested interests and partly to the fact that too much had been attempted in the original Bill. The *Manchester Guardian* considered the legislation as "dead" for the purpose of national reconstruction.

There were those who held that its popularity with the industry did not necessarily emanate from an active desire to make voluntary reorganisation a success, but was rather a sign of satisfaction that the first round in the battle for the reorganisation of the industry had been won by the existing vested interests against those who sought to socialise it. This view is supported by the fact that every effort was made to prevent the re-introduction of the jettisoned sections of the 1919 Bill, although at least the financial clauses were essential for the working of J.E.As. Mr. Neville Chamberlain pleaded for time for the Act as it stood to work out.⁷³ The *Times* expressed the opinion that little attention need be paid to the Lord Chancellor's assurance that the deleted clauses would be introduced in a new Bill next year : "we shall hear little more for a long time to come of a scheme which on a moderate estimate would have cost £150 millions in the near future."⁷⁴

(b) *The Failure of the Act*

What was the actual progress made after the passing of the Act ?

⁶⁹ *Engineering*, 109 (1920), p. 18 ; *El. Times*, 56 (1919), p. 481.

⁷⁰ *J.I.E.E.*, 60 (1922), p. 791.

⁷¹ *J.I.E.E.*, 59 (1921), p. 32.

⁷² *El. Times*, 57 (1920), p. 1.

⁷³ *Parl. Deb.*, H.C., 22-12-19, Vol. 123, c. 1120.

⁷⁴ *The Times*, 18-12-19, Leader.

In their first Report, the Electricity Commissioners surveyed the situation and emphasised the wastefulness and inefficiency of the existing organisation of electricity supply, the urgent need for co-ordination among the existing authorities, and the advantages in conservation of capital and coal and in increased efficiency to be derived from joint action.⁷⁵ By March, 1921, they had provisionally determined 13 districts, covering a little more than half the area of England and Wales. The size of the areas varied, the Lower Severn District comprising portions of the counties of Gloucester, Herefordshire, Wiltshire, Somerset, Worcestershire, and Monmouth, whereas Lancashire was split up into four small districts. By March, 1923, four Draft Orders embodying approved schemes had been published and a further five were in course of preparation.⁷⁶ The organisation adopted varied from Joint Electricity Authorities, in some cases providing for the transfer of the actual work to existing power companies, to loose associations in Advisory Boards and Advisory Committees.

The initial satisfaction of the Electricity Commissioners with the willingness of undertakers to co-operate in the promotion of voluntary schemes⁷⁷ gave place to a growing disappointment with the inconclusive nature of the propositions put forward and the slow progress of the schemes, owing to the necessity for reconciling the many divergent interests.⁷⁸ The conditions revealed by local enquiries were "profoundly discouraging." The undertakers had been given a grand opportunity for co-operative effort, for which they had asked with unanimity and fervour in 1919, but it turned out to be only unanimity for obstruction. The local enquiries showed mainly an intense jealousy between undertakers⁷⁹ and the Commissioners became aware of the extent to which engineering schemes, dictated by electrical considerations alone, were driven into the background by the pressure of numerous local interests, with the result that in most districts the prospect of the formation and efficient operation of Joint Authorities receded.⁸⁰

The lack of progress in the reorganisation schemes could partly be attributed to business conditions, as the acute depression with

⁷⁵ *El. Com. 1st Annual Report* (1920-21), p. 16.

⁷⁶ *Loc. cit.*, 3rd Report (1922-3), p. 8.

⁷⁷ Cf. Sir E. Geddes, *Parl. Deb.*, H.C., 13-12-20, Vol. 126, c. 71.

⁷⁸ *Elec. Com. 2nd Report* (1921-2), p. 14.

⁷⁹ *El. Rev.*, 88 (1921), p. 162.

⁸⁰ *Loc. cit.*, p. 263; *El. Com. 3rd Report*, p. 33; *El. Times*, 59 (1921), p. 525.

high rates of interest no doubt acted as a strong deterrent from any large-scale investment. The main causes, however, were inherent in the compromise solution of the 1919 Act. Could an heterogeneous body, such as a J.E.A., forced to depend entirely on the voluntary co-operation of such diverse interests, ever be successful? Opinion on this point was divided, some demanded the restitution of compulsory powers, others denied the possibility of success of joint bodies altogether, whereas others still hoped for an early improvement by voluntary effort.

The case of those who insisted on the restoration of the compulsory powers was simple. The continuation of the internal jealousies which, in the past, had prevented effective co-operation, the multitude of vested interests with powerful political influence, reduced the chance of success with voluntary schemes to a pious hope.⁸¹ The function of the Commissioners was to formulate co-ordinated schemes for the whole country, but they lacked the power to enforce the execution of their proposals. It was, therefore, suggested that further powers including the restitution of the District Boards would have to be granted by Parliament, before the ideas propounded in the Williamson Report could be carried into effect.⁸² Only by unity of control over a district could the expected advantages of co-ordination be secured.⁸³

The government originally shared this opinion and duly introduced in the Session of 1920 a Bill incorporating the jettisoned parts of the 1919 Bill. The opposition had meanwhile increased in strength and claimed that the few advocates of compulsory purchase and compulsory J.E.As. had dwindled to a negligible minority. The national interest would be best served by allowing the various districts to work out their own salvation under the guidance of the Electricity Commissioners.⁸⁴ Local authorities opposed compulsory powers, although the President of the I.M.E.A. considered them essential.⁸⁵ The Minister of Transport accepted the argument of the opposition and referred to the general disposition on the part of undertakers and authorities to co-operate in the promotion of voluntary schemes within the ambit of the 1919 Act, which made it

⁸¹ *Manchester Guardian*, 17-12-19; *El.*, 84 (1920), p. 1.

⁸² *El. Rev.*, 88 (1921), p. 162; *Proc. I.M.E.A.* (1920), p. 6.

⁸³ H. Dickinson, *Chairman's Address, J.I.E.E.*, 39 (1921), p. 56.

⁸⁴ *El. Times*, 57 (1920), p. 389.

⁸⁵ *Proc. I.M.E.A.* (1920), p. 6.

unnecessary for Parliament to consider the larger powers contemplated.⁸⁶ Consequently, the government withdrew the Bill and made no further attempt to carry out the comprehensive scheme of reorganisation embodied in the 1919 Bills.

The defeat of the compulsory District Board proposals did not encourage voluntary co-operation; on the contrary, opposition was immediately directed with equal force to the Joint Electricity Authorities, which were widely attacked as soon as the danger of the District Boards had receded. Serious objections can be raised against the principle of voluntary joint bodies, but judging by the form of the campaign, the impression cannot be avoided that the opposition was largely based on the disinclination of vested interests to surrender any of their powers. As before in the case of District Boards, so now the formation of J.E.As. was denounced as the first step towards a general nationalisation of industry, and Rate-payers' Associations, Chambers of Commerce and others were urged to throw their weight against any proposal to finance the Joint Authorities on the security of rates.⁸⁷ In Parliament amendments were introduced intended to complicate the procedure for the formation of J.E.As. still further, ostensibly in order to strengthen Parliamentary control.⁸⁸

(3) *Alternative Solutions*

(a) *Power Companies*

The threat of further legislation was at first too real to permit a merely negative opposition to the idea of Joint Electricity Authorities, and a number of alternatives were suggested. As the antagonism between the private and public sector of the industry was one of the main obstacles to reconstruction, one proposal was to constitute two joint authorities, one for each sector, with certain arrangements for linking up.⁸⁹ The geographical distribution of public and private supply undertakers rendered such a scheme impracticable, with the possible exception of London, where this suggestion found serious consideration.⁹⁰ In most proposals the existing under-

⁸⁶ *Parl. Deb.*, H.C., 13-12-20, Vol. 126, c. 71.

⁸⁷ Communication of Prov. Elec. Supply Committee, quoted *EL.*, 86 (1920-1), p. 514.

⁸⁸ Cf. G. Balfour, *Parl. Deb.*, H.C., Vol. 154, 15-5-22, c. 183.

⁸⁹ Cf. *EL. Times*, 61 (1922), p. 339.

⁹⁰ Cf. *supra*, p. 168

takers endeavoured to retain the full exercise of their powers, only conceding a limited degree of interference from the Electricity Commissioners and, possibly, regional advisory bodies.

The power companies demanded in many districts to be entrusted with generation and main transmission, though under suitable safeguards and control by the Electricity Commissioners.⁹¹ In the West Riding of Yorkshire, for instance, the Yorkshire Electric Power Company had a predominant position and claimed to be the most suitable instrument of reorganisation, both on account of its own efficiency and public spirit, and in view of the dissension and lack of capital of its rivals.⁹² In view of the municipal opposition the Commissioners decided that the district should be divided into two agreed areas, one supplied by the inter-connected municipal stations combined in a J.E.A. and the remainder by the power company,⁹³ which should also have the right to give power supply to the J.E.A. and to become the authorised distributor for undeveloped areas.⁹⁴ In spite of the Commissioners' efforts, it proved impossible to form a scheme on the basis of power company control acceptable to all the interests concerned.⁹⁵

From the technical point of view, power companies were probably the most satisfactory alternative to the proposed regional bodies. They had been set up for the same purpose, namely to bring about concentration of generation for large areas with the object of cheapening the cost of electricity. They had, however, as a whole failed in their aim for various reasons, one of the most important of which was the absence of compulsory powers to supply in bulk to the main urban centres. The desire of municipalities to remain independent from companies might be understandable, but would have to be sacrificed in the interest of the national development of electricity. The chances of success for a power company could, therefore, be improved if they were granted the monopoly of wholesale generation for a district.

Strong powers of supervision and positive direction would have to be placed in the hands of the Electricity Commissioners combined with facilities for providing subsidies for unprofitable

⁹¹ *El. Rev.*, 88 (1921), pp. 2, 263; cf. *El. Rev.*, 96 (1925), p. 749.

⁹² *Loc. cit.*, p. 736.

⁹³ *El. Com. 2nd Report*, p. 16.

⁹⁴ *Ibid.*, 3rd Report, p. 30.

⁹⁵ *Ibid.*, 5th Report, pp. 20-23.

development schemes : if the term of tenure for the companies had been limited to a moderate period of years, a reorganisation on the basis of power company control might have been the best solution, at least in some parts of the country. This would, however, have necessitated compulsory powers to overcome local opposition which the power companies themselves denounced as unnecessary.

Another means of effective public control might have been found in the creation of mixed undertakings as suggested for London in the L.C.C. Bill of 1915.⁹⁶ This provided for a Joint Authority mainly charged with supervisory and advisory functions, whilst a power company would undertake the actual work of generation and transmission. A committee of electrical engineers supported this idea,⁹⁷ and, in one area, the North Wales and South Cheshire Electricity District, the principle was adopted.⁹⁸ The circumstances in this instance were favourable as the power company predominated in a relatively undeveloped area, but even so, the scheme was only accepted after the City of Chester had secured exclusion from the District. Undoubtedly, the objections to such a proposal and the dangers of friction were great, but as at the time the government and Parliament were not prepared to centralise generation under a national body, a power company acting with some regional supervising board would have had sufficient scope and a fair chance of success. The 1919 Act had actually provided for such a solution by permitting the lease of undertakings by the Joint Electricity Authorities, and, in spite of the antagonism of local authorities towards private concerns, such an arrangement might have been possible.

Unfortunately, the power companies committed themselves to a very hostile and uncompromising attitude towards any public authority,⁹⁹ although it was clear that in most areas they would play an important part if only they accepted the principle of control and supervision by a Joint Board.¹⁰⁰ Instead, the Incorporated Association of Electric Power Companies issued a memorandum stating that the setting up of a Joint Electricity Authority in a power company area was simply providing a new statutory body

⁹⁶ Cf. *supra*, p. 914.

⁹⁷ *El. Rev.*, 88 (1921), pp. 2, 736.

⁹⁸ *El. Com. 3rd Annual Report* (1922-3), pp. 20-24.

⁹⁹ *El.*, 88 (1922), p. 327.

¹⁰⁰ *El. Times*, 61 (1922), p. 339.

to carry out functions already entrusted to that power company by Parliament, and would lead to a duplication of supply. The operation of J.E.As. should, therefore, without exception be excluded from the areas of power companies.¹⁰¹ They went so far as to demand that no local authority or County Council within the area of a power company should be allowed to give financial assistance to a Joint Authority, but should be permitted in certain circumstances to participate in the financing of power companies.¹⁰²

The memorandum overlooked completely the changed position of electricity since the early Power Acts and did not apparently recognise the necessity of a scheme which would close the gap between the power companies and the municipal undertakings.

(b) *Advisory Boards*

The proposed transfer of all generation and main transmission within a district to a power company constituted, at least technically, a progressive step, as it involved the centralisation of plant and the elimination of inefficient stations. Neither municipal nor company undertakers, however, were willing to hand over their plant to these companies ; on the contrary, their opposition was, if anything, stronger than their objection to entrusting a J.E.A. with wholesale supply powers. During the local inquiries held after the establishment of districts under the 1919 Act it became increasingly obvious that many undertakings were more concerned to remain independent and retain their existing powers than to contribute to any real reorganisation if this meant a sacrifice of "rights." They realised that the complete negation of the recent legislation was impossible, but considered the idea of Joint Electricity Authorities sufficiently discredited to put forward a weaker alternative, namely the creation of Advisory Boards without executive powers, simply charged with the planning of a common development policy.

The advantage of such a Board lay in the fact that it could be set to work immediately without lengthy enquiries and proceedings, but the success of its activities depended on the goodwill of the various undertakers to an even greater extent than in the case of J.E.As., no power being provided for the actual carrying out of a scheme.¹⁰³ The Electricity Commissioners referred to a "marked

¹⁰¹ Cf. J. S. Highfield, *J.I.E.E.*, 60 (1922), p. 791.

¹⁰² Quoted *El. Times*, 61 (1922), p. 363.

¹⁰³ *El. Times*, *loc. cit.*, p. 73.

desire on the part of many undertakers to be allowed to continue to develop independently as under the former regime," and to "preference shown in various parts of the country for schemes providing for advisory boards only. Such schemes necessarily leave the development of generation and main transmission to individual undertakers as hitherto and fall short of the objects contemplated by the legislation of 1919."¹⁰⁴

The Commissioners still considered the J.E.As. as the most satisfactory form of reorganisation under the given circumstances, which would obtain maximum economies.¹⁰⁵ The industry, however, showed a complete lack of enthusiasm for and a good deal of antagonism against the proposed Joint Electricity Authorities,¹⁰⁶ and made it clear that a voluntary reorganisation of electricity supply would not take the form of J.E.As. The government, therefore, accepted in the Act of 1922 that "other bodies" could be formed in place of J.E.As., a concession which amounted to the final abandonment of the ambitious regional reorganisation plans of 1919. It was made after a lengthy struggle in order to achieve the passage through Parliament of the financial clauses necessary for the functioning of regional bodies. Advisory Boards were formed in the South-East Lancashire, Mid-Lancashire and East Midland districts. They had the obligation to submit to the Electricity Commissioners for approval schemes for the control of inter-connected stations so as to ensure the best utilisation of existing generating resources. Up to the time of the 1926 Act no such proposals had been submitted to the Commissioners and after that date they were considered as unnecessary, as the generating side was henceforth comprehensively planned by the Central Electricity Board.

Although the Advisory Boards had done useful work in facilitating development, the Commissioners were doubtful whether their remaining functions were sufficiently important to warrant their continued existence. The South-East Lancashire Board was accordingly dissolved in 1931, but the other Boards claimed that they could assist in the development of distribution and decided to carry on.

¹⁰⁴ *El. Com. 4th Annual Report* (1923-4), p. 14.

¹⁰⁵ *Ibid.*, 2nd *Annual Report* (1921-2), p. 20.

¹⁰⁶ Archibald Page, Presidential Address, *J.I.E.E.*, 66 (1928), p. 3.

(4) *Financial Powers for J.E.As.*

The continuous retreat of the government from its original position can partly be explained as a result of orthodox financial practice. Considerations of economy and the fear of any policy which might add to the burden of the national debt prevented the government from accepting responsibility for the financial success of electricity reorganisation. Their main concern was to avoid any liability and they therefore even rejected a modest request for a guarantee made by the Association of Municipal Corporations with the explanation that the government did not consider their guarantee as essential in view of the fact that the J.E.As had the security of their undertakings.¹⁰⁷ Concession after concession was made in the hope of reconciling the existing undertakers with the proposed Regional Boards, making them willing to finance the reorganisation schemes.

In fact, the State assisted the electricity supply industry, not for the purpose of supporting its reorganisation, but in consequence of its policy of relieving unemployment. The Treasury was empowered by the various Trades Facilities Acts to guarantee the interest for loans on capital works. Of a total of £65 millions thus guaranteed, approximately £4.12 millions referred to electrical schemes.¹⁰⁸ Further subsidies derived from unemployment grant schemes, either in the form of payments towards the interest of loans, or payment of 75 per cent. of the wages of workers newly engaged on public works, etc. The Electricity Commissioners had to advise the Unemployment Grant Committee on applications for such grants made by local authorities.¹⁰⁹ The government assistance was, however, only given on a small scale and municipal authorities frequently found difficulties in obtaining the necessary funds during the financial depression.¹¹⁰

Joint Electricity Authorities or other regional bodies could not, therefore, rely on State assistance. At the same time, they could not borrow nor were local authorities authorised to assist them financially, as the financial clauses of the 1919 Bill had been jettisoned. In order to give them at least a chance of life the government had, immediately after the withdrawal of the comprehensive 1920 Bill,

¹⁰⁷ *El. Times*, 58 (1921), p. 107.

¹⁰⁸ Balfour Committee on *Factors in Industrial Efficiency* (1927), p. 431.

¹⁰⁹ *El. Com. 2nd Annual Report* (1921-2), p. 45, and later reports, *passim*.

¹¹⁰ *Cf. infra*, p. 277.

introduced a more modest measure, restoring the financial clauses only, but the opponents of any reorganisation successfully frightened Parliament and the public with the prospect of immense expenditure by public boards,¹¹¹ and neither the 1920 No. 2 Bill nor its successor during the next session was passed. In 1922 a modified Bill was introduced into the House of Lords by Viscount Peel, who expressed the view that no controversial elements remained in it. Indeed, the measure was so hedged round with safeguards that the boggy of municipal extravagance could no longer haunt even the most sensitive of minds.¹¹²

In spite of this, indications were not wanting that the passage of the Bill would again be strenuously resisted both in Parliament and by the financial Press. This time the municipal bodies took active steps to make their views known and the I.M.E.A. sent to all the Lords copies of a unanimous resolution "that the Bill should be carried into law at the earliest possible date in the interest of industry."

Even among the parties most closely concerned, the majority in favour of the Bill was "overwhelming."¹¹³ The opposition, it was thought, would be negligible but for the assistance from interests hostile to the electrical industry.¹¹⁴ The antagonism in the House of Lords was based upon a "misconception of the intention of the Bill and ignorance of the circumstances" and assumed a "ridiculous aspect,"¹¹⁵ when it was gravely alleged that the Bill, which only supplemented the main 1919 Act, was too technical and complicated to be dealt with by the House, and should be referred to a Select Committee. The proposed right of local authorities to assist the new J.E.As. financially was considered a power of the most tremendous and far-reaching character involving enormous speculative risks and debts for the local ratepayer.¹¹⁶ Viscount Peel rightly called it absurd that after the principal Bill had been discussed on the floor of the House, the much smaller amending measure should not be dealt with in the same way.¹¹⁷

The prospects of the Bill seemed as poor as in previous years, but

¹¹¹ *El. Times*, 59 (1921), p. 270; *El. Rev.*, 88 (1921), pp. 583, 638.

¹¹² *El. Rev.*, 91 (1922), p. 37; cf. *Parl. Deb.*, H.L., V. 49, c. 261.

¹¹³ *El. Times*, 61 (1922), pp. 255, 524.

¹¹⁴ *El.*, 88 (1922), p. 365.

¹¹⁵ *El. Rev.*, 90 (1922), p. 362.

¹¹⁶ Cf. Lord Buckmaster, *Parl. Deb.*, H.L., Vol. 49 (1922), c. 305.

¹¹⁷ *Ibid.*, c. 1078.

unexpectedly good progress was made in committee, as "the Lords seemed in no temper to stand the vague fulminations about colossal expenditure."¹¹⁸ The willingness of the government, to make concessions no doubt smoothed the passage of the Bill; they accepted modifications in favour of power companies which were freed from the menace of J.E.A. competition, and of supply companies which could obtain an extension of their tenure, and of the local undertakers.

The opposition in the House of Commons, perhaps realising that it was impossible this time to defeat the measure, confined their efforts to rendering the procedure as cumbrous, expensive and time-wasting as possible¹¹⁹ on the pretext that Parliamentary control should be strengthened. Thus Mr. George Balfour proposed that the control of the financial power should remain entirely with Parliament which could empower the Electricity Commissioners to grant borrowing powers for specific purposes by the provisional order procedure.¹²⁰ This proposal, which would have necessitated a confirming Act for every application and would have seriously handicapped the development policy of the Commissioners, was, fortunately, not adopted.

After a series of "bargains between one financially interested party and another,"¹²¹ the Bill was eventually passed as the *Electricity (Supply) Act, 1922*.¹²²

What is surprising about the three years' struggle over the grant of financial powers to J.E.As. is not the success of the 1922 Bill, but the failure of the previous attempts. The local authorities had all along been in favour of making the regional boards effective alternatives to power companies, especially as the Bills were only permissive and did not attempt to enforce any kind of re-organisation. For the same reason, the companies, except a small minority, could not object to such an innocuous proposal, but the minority succeeded in giving the impression of having widespread and important support.

In 1922 propaganda by the municipal interests was effective in clarifying the issue and even the opposition restricted its activities,

¹¹⁸ *El. Rev., loc. cit.*, p. 506.

¹¹⁹ *El. Times, loc. cit.*, p. 524.

¹²⁰ *Parl. Deb., H.C., 5th Series, Vol. 154, c. 183.*

¹²¹ *Mr. Hopkinson, Parl. Deb., loc. cit.*, Vol. 157, c. 311.

¹²² 12 and 13 Geo. V. ch. 46.

when the possibility of an impending dissolution of Parliament raised the danger of a Labour Government introducing stronger measures to redeem the promise of cheap electricity which had appeared so pressing and essential immediately after the war.¹²⁸

(5) *The 1922 Act*

The main result of the new Act was to enable the J.E.As. to borrow money for the purpose for which they were created, and to empower supply undertakings and local authorities in the area, as well as others interested, to lend money or guarantee the payment of interest. In order to protect the ratepayer against excessive responsibilities, lending powers, subject to control by the Minister of Health, were only granted to authorities of more than 50,000 inhabitants, and were limited to an amount not exceeding a 1d. rate (Sec. 5 (1)). The Electricity Commissioners, after giving their consent to any scheme, had to issue a special order, which was subject to the approval of Parliament.

In addition to the financial provisions, the Act incorporated clauses designed to assist and to a certain extent strengthen the existing undertakers. Thus, the right of the J.E.As. to supply electricity within the areas of power companies was curtailed. It was no longer sufficient for the Electricity Commissioners to be satisfied that a company was unwilling and unable to give a supply of electricity upon "reasonable terms." The potential consumer must be prepared to enter into a binding contract with the power company "to continue to receive and pay for supply of electricity upon such terms and conditions as will, in the opinion of the Commissioners, offer an adequate return to the power company"; he must also be prepared to give adequate security for the payment of all sums which may become due to the power company under the contract. Only if all these conditions were fulfilled and the company was still unwilling to supply, could the J.E.A. be authorised to supply electricity without the consent of the power company (Sec. 16). This alteration constituted a most powerful protection of the power companies, and rendered them practically secure against the threat of competition by the regional bodies which the 1919 Act had intended as a spur for them.

On the other hand, the exclusion of parts of power company

¹²⁸ *El. Times*, *loc. cit.*, p. 339¹; *El.*, 88 (1922), p. 306.

areas, even though already supplied by them was rendered easier. If in a district the supply right of a company was subject to the absolute veto of some other authorised undertaker; for instance, if a municipal authority was taking a bulk supply from a power company, the authority could make arrangements with the J.E.A. instead, on condition that a generating station exclusively engaged on this supply should also be transferred to the J.E.A. (Sec. 17). This amendment was the result of a bargain entered into by the government, the Association of Municipal Corporations and the Power Companies Associations.¹²⁴

The defeat of the principle of concentration in generation is shown by clause 13. The Electricity Commissioners could no longer refuse their consent to extensions or the erection of new power stations for local purposes, if the undertaker could prove that his costs would not be higher with independent operation than if he followed the instruction of the Commissioners and obtained a bulk supply.

The purchase date of a number of company undertakings was approaching and with it a disturbing uncertainty, as under the existing legislation a local authority, in exercise of its purchase rights, could give notice of its intention to purchase the undertaking within six months of the actual purchase date.¹²⁵ The intention behind this limitation of six months between "notice" and "purchase date" had been to prevent a Council from binding its successor in this important matter. But the whole question of the exercise of purchase rights of a local authority, which might result in the splitting up of a comparatively small distribution area into still smaller fragments, was one calling for review, and Section 14 empowered the Electricity Commissioners to suspend, with the consent of the public body, the purchase right of a Joint Authority, County Council or local authority. Where, after consideration, an extension of the company's tenure was deemed best in the public interest, the Commissioners could insist on a sliding scale of prices and dividends for the companies.

(6) *Distribution*

Although the purpose of the war-time schemes and the 1919 legislation had been to provide "cheap and abundant" electricity to

¹²⁴ *Parl. Deb.*, H.C., Vol. 157, 25-7-22, c. 262.

¹²⁵ Cf. Section 2 of *El. Lighting Act*, 1888.

the final consumer, practically all proposals had concentrated on the urgently needed reorganisation of generation and transmission, and had left retail distribution untouched. There had been an appreciation of the fact that the existing areas of supply were not necessarily ideal even for retail distribution¹²⁶ and that a comparatively small number of distributing undertakings with a high diversity of demand would be advantageous¹²⁷; but on the whole, it was felt that distribution, especially in the case of larger towns, should be left in the hands of the existing authorities.¹²⁸ The undertakers were generally complimented upon their distribution efficiency and assured that no infringement of their rights was intended. Exceptionally, Mr. W. Fennell considered a reorganisation of distribution an absolutely essential accessory to the generation and transmission of electricity over large areas and recommended the formation of distribution Boards, similar to the District Electricity Boards, on a compulsory basis.¹²⁹ The acceptance of this proposal would have virtually meant the complete elimination of the existing electricity supply undertakers, company and municipal, and was, therefore, politically impossible, even if there had been agreement from a technical point of view.

On the other hand, it was obvious that reorganisation on the generation side alone would not materially affect the final consumer and a number of provisions in the 1919-22 Acts purported to assist progress and encourage a speedy development of neglected areas. The most important of these may be summarised as follow: the constitution of Joint Electricity Authorities themselves incorporating representatives of large and small consumers; the supply powers of these authorities extending over the whole district, except where other authorities already had supply rights and were making good use of them; the possibility of transfer of undeveloped areas to the J.E.A.; the control of these bodies by the Electricity Commissioners who could require proposals within a limited period for securing supply in undeveloped areas and had the right to impose a time limit for carrying out any such proposal;¹³⁰ the power of the Commissioners to suspend the purchase

¹²⁶ Cf. *Garcke's Manual*, XXII (1918-19), p. 20.

¹²⁷ *El.*, 79 (1917), p. 153; *Williamson Report*, *loc. cit.*, s. 65.

¹²⁸ *Ibid.*

¹²⁹ *El. Times*, 59 (1921), p. 245.

¹³⁰ *El. Com. 2nd Annual Report* (1921-2), p. 18.

rights over company undertakings for definite periods with the consent of the purchasing authorities and to transfer the purchase rights of local authorities to Joint Authorities (Sec. 13 (2)); the granting to undertakers, consumers and local authorities of the right to demand revision of the maximum prices, the period for revision being reduced to three years (Sec. 22 (2)); and savings in costs through the formation of J.E.A.s to be taken into account when revising prices (Sec. 22 (4)).

The Electric Lighting (Clauses) Act of 1899 had enabled the consumer to insist on "a flat rate" tariff (Sec. 31 (2)), which had frequently been a severe disadvantage to the undertakings. Power consumers, in many cases, had generated their own electricity for normal demands and had used public undertakings only for peak demand and standby purposes. This necessitated expensive reserve capacity and transmission equipment, the cost of which was by no means covered by the flat-rate charges. Sec. 22 (1) of the 1922 Act withdrew the right of consumers to demand a flat-rate tariff in those cases in which the Electricity Commissioners had approved alternative general tariffs.

Lower prices in themselves stimulated demand, but more than cheapness was required to overcome the conservatism of many industrial users. To assist in developing the demand for electricity and drawing attention to new uses, the British Electrical Development Association (E.D.A.) was formed in June, 1919, originally supported both by the manufacturing and the supply sector of the industry. By means of propaganda, lectures and demonstrations, frequently in conjunction with the Electric Lamp Manufacturers' Association (E.L.M.A.), new interest in electricity was thus aroused, especially for domestic purposes, and this activity became, and still remains, a potent factor in the growth of electricity consumption.

V. CONCLUSIONS

The attempts to reorganise electricity generation on regional lines were so obviously a failure that within four years of the 1922 Act a Conservative Government passed a radically different scheme, based on complete central control of electricity generation and transmission. The conclusion might be drawn from this experience that at least in a small country like Great Britain, there is no room for autonomous administrative bodies intermediate between the

local and the national authority, a view held, for instance, by Mr. Herbert Morrison.¹³¹

It is, however, very important to bear in mind that only a particular type of authority was considered, namely the joint board created with such limitations of powers as to minimise the chances of success. "One main cause of the failure to plan efficiently during the last 20 years has been an excessive tenderness towards small but influential minorities. Even a limited degree of compulsion has often been accompanied by so many checks and safeguards as to make it almost unworkable and extremely slow in action."¹³²

Reliance on voluntary reorganisation was bound to be fatal in an industry which at that time paid only lip service to the truth that "the ultimate good would never be evolved by each undertaking pressing its own cause irrespective of its fellows"¹³³ and which, according to the President of the I.M.E.A., suffered from a preference for the *status quo* and a regrettable lack of co-operation.¹³⁴ The only major result of the legislation of 1919-22 was the creation of the Electricity Commissioners, which provided at least a limited control of the industry and laid the foundation for the broader national scheme of 1926.

¹³¹ H. Morrison, *Socialisation and Transport* (1933), p. 147.

¹³² Mr. J. R. Beard, Pres. Address, *J.I.E.E.*, 88 (1941), p. 20.

¹³³ *El. Rev.*, 91 (1922), p. 468.

¹³⁴ *Proc. I.M.E.A.* (1921), p. 4.

CHAPTER VII

THE FORMATION OF THE LONDON AND HOME COUNTIES J.E.A.

I. INTRODUCTION

IN the previous chapter a general outline was given of the efforts to reorganise the electric supply industry on regional lines, and it was pointed out that the whittling down of the powers conferred on Joint Electricity Authorities by no means increased their popularity with the existing undertakers. It is, therefore, not surprising that by 1926, when new legislation brought a complete change in the situation, only three Joint Electricity Authorities had been formed in Great Britain, and, in spite of encouragement in that Act, only one further Authority was created in 1928.

1. The *North Wales and South Cheshire J.E.A.*, which had been in operation since August, 1923, and which had transferred all executive power to the North Wales Power Company.¹ The power company actually covered 46 per cent. of the population and 60 per cent. of the area of the whole district and made marked progress in the provision of bulk supply, superseding local generation. The transmission scheme had already stimulated a number of applications for special orders for distribution powers in undeveloped areas which promised to increase the area covered by distribution rights from 4.7 per cent. in 1926 to 37 per cent., with a corresponding increase in the proportion of the population supplied from 35 per cent. to 73 per cent.²

2. The *West Midland J.E.A.* provided the only instance "where the full support of all the local authority and company

¹ Cf. *El. Com. 4th Annual Report* (1923-4), pp. 19-22.

² *Loc. cit.* 6th Report (1925-6), p. 12.

undertakers concerned has been forthcoming both to the establishment of a J.E.A. and to the transfer of generating stations in the district to the J.E.A.”³ The order creating the authority came into force in December, 1925, and incorporated a technical scheme for the immediate erection of a new generating station and the utilisation and inter-connection of existing plant.

3. The *London and Home Counties J.E.A.* was formed in July, 1925, 25 years after the need for a comprehensive reorganisation of supply in London had been realised, but its powers and functions were severely circumscribed.

An attempt will now be made to illustrate by the example of London how various sectional interests have successfully opposed the establishment of any really effective co-ordinating authority. The development will be followed in some detail to show the steady strengthening of centrifugal forces which takes place once the threat of strong central control is removed.

To understand the peculiar body eventually created for the London and Home Counties Electricity District, it will be necessary to cast a glance at the developments which took place during the war and before the passing of the 1919 Act. Apart from a few examples of co-operation,⁴ there had been very little progress towards a unified organisation for Greater London. Compared with 1905, when Mr. Merz promoted his first power supply scheme, “the chaotic conditions of affairs then revealed had improved only to a slight extent.”⁵ The fact that within 4 or 5 miles from Hammer-smith nine new power stations had been built in addition to the existing 21, could be shown as a warning example of unco-ordinated construction.⁶ No part of the country required combination in supplying electricity more urgently than London and more drastic steps than the L.C.C. scheme of 1915 appeared necessary.⁷

The main reasons for the slow progress were the parochial legislation of the past and “a host of vested interests which, it seems, will only be co-ordinated under compulsion, as everyone all along has been suspicious of everyone else.”⁸ After the war the demand for electricity suffered a short set-back, but soon rose to

³ *Loc. cit.* 5th Report (1924-5), p. 20; 7th Report (1926-7), p. 149.

⁴ Cf. *supra*, p. 102.

⁵ *El. Rev.*, 87 (1920), p. 514.

⁶ Coal Cons. Rep., B.P.P. (1917-8), XVIII, clause 16.

⁷ Williamson Rep., B.P.P. (1918), VIII, s. 64.

⁸ *El. Times*, 58 (1920), p. 289.

such an extent that, in spite of their objection to piecemeal and unco-ordinated development, the Electricity Commissioners were forced to sanction extensions of existing stations. Controversy arose out of the application by the County of London Electric Supply Company for permission to erect a power station at Barking without waiting for a comprehensive scheme for London. The company planned to build a station with a capacity of 60,000 kW as a first instalment, and to increase it later to 200,000 kW. The scheme was opposed on the ground that it would pre-judge the Greater London scheme, and the Commissioners had to decide whether to lose the certainty of a bulk station being immediately put in hand on the sporting chance that the existing undertakers would reach agreement in the near future. They deferred a decision pending the enquiry into the proposals for the formation of a Joint Electricity Authority, but later, when the technical scheme providing for the construction of capital stations had been generally accepted, they consented to the building of the Barking station as a first step towards the reorganisation of London supply, on condition that it should be purchasable within a few years by the Joint Authority when established.

After the ambitious L.C.C. scheme of 1914 for centralising the control of generation in the London area had been dropped by the Council, a conference of the Metropolitan Boroughs owning electricity undertakings and the L.C.C. passed a resolution, proposing the establishment of a central authority for London composed entirely of municipal interests. It further recommended that the closer co-operation between the existing undertakings authorised in the London Electric Supply Acts, 1908-10, should be made compulsory, but that otherwise there should only be a minimum of interference with existing municipal undertakings. The L.C.C. agreed to transfer retail distribution back to the boroughs after taking over the company undertakings in 1931.⁹ After the publication of the Williamson Report a further Conference of the Local Authority Undertakings in Greater London came to similar conclusions, but agreed to wider powers being granted to the proposed Greater London Electricity Board. This Board was to control the new super-stations and to acquire the purchase powers of the L.C.C. Its proposed functions included the right to prevent any under-

⁹ Quoted *El. Times*, 49 (1916), p. 428.

taking from generating electricity, if its costs exceeded certain defined rates.¹⁰ The necessity of a unified generation and bulk supply was clearly accepted, but the exclusively municipal character of the proposal was contrary to the intentions of the Williamson Committee, and aroused strong opposition from company interests.

II. A JOINT AUTHORITY FOR LONDON

(1) *Orthodox J.E.A. Schemes*

The newly-established Electricity Commissioners took a first step towards the reorganisation of the electricity supply in London by issuing, in July, 1920, notice of the provisional formation of the London and Home Counties Electricity District, with the request that proposals for effecting an improvement in the organisation, including the formation of a Joint Electricity Authority, should be submitted before December 31st, 1920 (afterwards extended to March 31st, 1921). At a conference of all authorised undertakers, the Commissioners urged the necessity for a comprehensive and co-ordinated scheme and as a result the L.C.C., the Conference of Local Authorities Owning Electrical Undertakings in the Greater London Area (which will in this chapter be referred to as "the Conference") and the London Electricity Joint Committee, 1920, Ltd. ("the Joint Committee"), representing the West London companies, appointed a single Engineering Committee on whose recommendations all their technical proposals were based.

Agreement on the technical aspects of reorganisation by the three major parties was a favourable sign, and the differences in administrative detail were not sufficiently serious that they could not be overcome by the Commissioners with a compromise scheme using the best in all proposals.¹¹ The similarity of the suggestions, mainly due to the guidance of the 1919 Act and the Electricity Bill, 1920, which was at that time expected to become law, encouraged hope of an early settlement. Broadly speaking, the L.C.C. scheme¹² proposed a strong authority with considerable powers over the existing undertakings, while the "Conference" favoured greater independence for the local undertakers. The "Joint Committee" was constituted by the London Electric Supply Corporation, the

¹⁰ *El. Rev.*, 83 (1918), p. 630, etc.

¹¹ *Eng.*, 132 (1921), p. 7; *El.*, 87 (1921), p. 36.

¹² *L.C.C. Publication No. 2072* (1921).

Metropolitan Electric Supply Company, and the West End companies, and represented 62 per cent. of the capital and 65 per cent. of the units generated by all London companies. The most important outsider was the County of London Electric Supply Company with whom, however, eventually an agreement was reached. The scheme provided for the formation of a J.E.A. which, instead of purchasing the generating stations, would lease them so as to avoid the necessity of an immediate capital expenditure on a large scale.

Other proposals were submitted, one by the Poplar Borough Council for an East London Authority, which was not even supported by the East End municipal bodies themselves, and two by railway companies, which were withdrawn early in the course of the enquiry.

(a) *Area of the Electricity District*

In defining the London and Home Counties district the Commissioners went beyond the conception of Greater London, which had been the basis of the L.C.C. Bill of 1915, and included, in addition to the whole of the Counties of London and Middlesex, the major part of Surrey and portions of Kent as far as Sevenoaks, Essex beyond Tilbury, Hertfordshire as far as Hertford and St. Albans, Amersham and Eton in Bucks, and Windsor in Berkshire. The area totalled 1,660 square miles as compared with 1,000 square miles of the 1915 L.C.C. Bill,¹³ with a population of approximately 9 million.

The three main schemes had been based on the district thus defined, but during the enquiry the Joint Committee revised its ideas and included only an area within a circle of 10 miles radius from St. Paul's. This smaller district covered most of the built-up parts of London, but did not go far beyond the Administrative County of London boundaries in the south and ended at Hendon, Wembley and Enfield in the north. The reason given for this change was the contention of the companies that "it would not make for economy for one authority to have control over so large an area."¹⁴

The view that no benefit would be derived from the formation of a single authority for Greater London was also held by the Poplar Borough Council responsible for the East London J.E.A.

¹³ Cf *supra*, p.94.

¹⁴ *El. Times*, 59 (1921), p 623

scheme, which would have comprised 16 per cent. of the area and 47 per cent. of the population of Greater London. Their plea for independence or at least financial autonomy was based on the argument that an industrial area should not be hampered by being hitched to a larger and mainly non-industrial district, if it was capable of absorbing alone the supply of a capital station. This was not merely an expression of selfish parochialism; the progress of electricity in East London had been considerably quicker than in the remainder of the area, consumption increasing from 1914-20 by 46 per cent. as against 28 per cent.; total costs per unit were 1.434d. against 1.834d. and 80 per cent. of the total demand was for power, compared with only 50 per cent. in the larger area.¹⁵ The promoters claimed that East London would not benefit by incorporation in a larger scheme, but might suffer, and that a difference in price of 0.1d. per unit was a serious consideration in an industrial area, whereas in the West End 0.25d. or even more would not be of great importance.¹⁶

The Commissioners pointed out that by including East London in a larger area it would not suffer, as it would derive the full benefit from its favourable load factor. It was quite conceivable that the overall utilisation of plant would be increased, if the late night demand in the West End were joined to the day demand of the East. They considered it, therefore, short-sighted to establish a smaller district than that provisionally determined, especially if considerations of future development, suburban railway electrification and the tendency to de-centralise industry and relieve congested areas were taken into account.¹⁷

For the same reason, they did not accede to the claim of the Metropolitan Elec. Supply Company and the North Metropolitan Elec. Power Supply Company to be excluded from the district on the ground that the proposed Joint Authority would not help the companies for many years and would only mean financial burdens for them.¹⁸

(b) The Technical Scheme

The report issued by the Engineering Committee appointed by the L.C.C., the "Conference" and the "Joint Committee" drew

¹⁵ *El. Times*, 60 (1921), p. 6.

¹⁶ *Ibid.*, p. 27.

¹⁷ *El. Com. and Report* (1921-2), p. 78.

¹⁸ *El. Rev.*, 89 (1921), p. 110.

attention on the one hand to the increased capital cost of mains and generating plant, and on the other to the reduction of generating expenses that had already been brought about by the introduction of high-speed turbo generators and the use of cooling towers. These reasons, in their view, rendered it uneconomical for a number of years to shut down certain non-river stations.¹⁹ They recommended, however, the immediate construction of a number of capital stations and the reorganisation of the existing supply system in two stages :—

In the first, four capital stations were to be constructed, but meanwhile the best use would be made of existing plant. The area was to be divided into groups, each of which would be supplied by an existing efficient station ; 34 of the less economic stations would be progressively shut down.

In the second stage, commencing about 1925-6 and expected to last until 1931, the four capital stations would be in operation, three on the north side and one on the south side of the Thames. Twenty-six of the existing stations would be reconstructed and enlarged to act as capital stations and seven retained as auxiliary stations.

Although the three main schemes were based on these technical proposals, the local authorities and the L.C.C. adopted a more cautious attitude during the public inquiry in view of the severe economic depression.²⁰ In the supplementary particulars submitted by the "Conference" in May, 1921, it suggested that the construction of capital stations should be deferred to a later date. To raise capital at the high rate of interest ruling, and to put in hand equipment at the then existing high prices of plant, material and labour would impose an excessive financial burden on the scheme which would prevent for years the cost of electricity from being reduced to the fullest extent. As more than half the cost of electricity is due to capital charges, including the cost of secondary transmission lines and distribution, excessive payments for generating plant and main transmission lines could make an appreciable difference to the price of electricity as long as loan capital had to be repaid by local authorities within the short periods specified by the Local Government Board (later Ministry of Health). The government could have encouraged electricity development by

¹⁹ *Rep. of Eng. Com.* (1921), pp. 7-8.

²⁰ *El. Rev.*, 88 (1921), pp. 798, 807.

a more liberal financial policy, but the deflationary attitude of the Treasury and the banks rendered this impossible.

A further question arose in this connection, namely whether the capital charges for existing plant whose elimination was in the common interest, should not be borne by the J.E.A., as the whole area would benefit from a concentration of plant. If the individual locality remained responsible for the repayment of capital invested in local plant, bulk supply from the Joint Authority would only be economical at a price as low as the prime cost of running the local plant. As a result, the concentration of generation and the development of electricity supply would be delayed, penalising pioneer districts likely to have a considerable proportion of obsolescent plant, and favouring areas in which no capital had been invested.²¹ The suggestion of transferring capital charges to the J.E.A. was, however, considered too radical to be adopted.

The cautious attitude of the L.C.C. and the local authorities is an interesting illustration of the alleged ambition of public bodies recklessly to risk the ratepayers' money for large-scale enterprise. It was severely criticised as too pessimistic²²; prices would fall, money become cheaper and super-stations would, of necessity, assert themselves. A rapid increase of demand could be expected in the near future, so that the limit of linking-up and extending stations would soon be reached. It was, therefore, unwise to embark on investments which were only of temporary use.²³ The companies, free from irksome obligations regarding early repayment of capital, showed more enterprise. The "Joint Committee" favoured the immediate building of capital stations and Mr. Merz (representing the County of London Electric Supply Company) made a strong plea against any further delay in the creation of modern plant. His policy was to anticipate load and not wait for it.²⁴

Similarly, the local authorities promoting the East London scheme were of the opinion that none of the existing stations could be economically extended to accommodate the necessary large units of plant and proposed the construction of a large station at Dagenham allowing for an ultimate capacity of 400,000 kW.²⁵

²¹ Cf. A. Collins, *Financial Report to the Conference of Local Authority Undertakings* (1921), clause 29 and ff.

²² *El. Times*, 59 (1921), p. 595.

²³ *El. Rev.*, 88 (1921), p. 702.

²⁴ *El. Rev.*, 89 (1921), p. 110.

²⁵ Quoted *loc. cit.*, 88 (1921), p. 93.

The Electricity Commissioners accepted the principle of linking up in the first stage, but did not agree with the proposal to spend large sums on extensions ; to install a further 199,000 kW of plant in the existing stations would cost £975,000. On the other hand, they did not advise the building of 645,000 kW in new capital stations involving £24,000,000, which would have led to the throwing aside of more than half of the existing stations long before the end of their economic life.

They recommended a compromise, the construction of a new capital station at Barking, by the County of London Electric Supply Company, and the retention of a number of "group" stations. Apart from power companies, only six or seven of the chief company stations and an equal number of municipal stations should, however, ultimately survive, whilst 50 stations would be gradually closed down and others retained by the J.E.A. for standby purposes only.²⁶

(c) *Constitution*

All the major schemes provided for a Joint Electricity Authority, but there was considerable divergence of opinion regarding the size of and representation on the Authority, as may be gathered from the following table :—

PROPOSED REPRESENTATION ON LONDON AND HOME COUNTIES J.E.A.

<i>Representatives of</i>	<i>L.C.C. scheme 1921</i>	<i>"Confer- ference" scheme 1921</i>	<i>"Joint Commit- tee" scheme 1921</i>	<i>El. Com. decision 1921</i>	<i>Final J.E.A. 1925</i>
Total number of members	28	24	62*	26	33
Local Authority Under- takers—					
Inside County of London	6	8		8	8
Outside County of London		4			6
Companies	6	4		8	5
L.C.C.	8	3	6	6	6
Other County Councils ..	—	—	—	3	3
Purchasing Authorities ..	4	4	2	—	—
City of London	—	1	1	—	1
Railway Companies	2	—	3	1	2
Workers	2	—	—	—	2

* The Joint Committee Scheme proposed selection of representatives by Undertakers in proportion to amount of electricity sold. Total number approximately 62.

²⁶ *El. Com. 2nd Report (1920-1)*, p. 81.

The "Joint Committee" Scheme provided for a most unwieldy body which would in reality have to rely entirely on committees. There is little fundamental difference between the L.C.C. and the conference schemes, and the present constitution of the existing J.E.A. is largely based on these suggestions, modified in favour of stronger municipal representation owing to the virtual independence which was later granted to the companies.

(d) Functions of the J.E.A. under the 1921 Schemes

The various administrative schemes submitted to the Electricity Commissioners differed most in the functions and powers allotted to the new Authority. The L.C.C., the natural protagonist of a central control, proposed a strong body with the power of supervision and control necessary for carrying out the technical scheme. The Authority should erect the new stations and gradually acquire existing ones by agreement and with the consent of the Electricity Commissioners. There is no evidence for the statement²⁷ that the scheme intended to grant powers of compulsory acquisition of generating stations in the area, which would have gone beyond the limits of the 1919 Act.

All generating stations and main transmission lines of undertakers in the district would have to be used and operated at the direction of the J.E.A. as far as this was necessary to secure the fulfilment of the technical scheme, and the Chief Engineer of the J.E.A. should even have power to shut down uneconomic stations.²⁸ The Authority should submit proposals for the supply of undeveloped areas within two years of its formation.

By contrast, the "Conference" attempted a solution which would have left the existing undertakers as independent as possible. Certain specific powers were to be granted to the Authority, such as that of fixing standards of frequency, giving consent for extensions of plant, requiring arrangements for mutual assistance, loaning capital and appealing to the Electricity Commissioners for revision of prices and even of prohibiting the use of uneconomical generating plant, if bulk supply was favourable to the undertaker in the opinion of the Commissioners.²⁹ In many respects the powers of the new J.E.A. would have been similar, on a smaller scale, to those of the Commissioners themselves, namely to interfere and advise

²⁷ Cf. *Engineer*, 132 (1921), p. 7

²⁸ *El. Times*, 58 (1920), p. 433; *loc. cit.*, 60 (1921), p. 97.

²⁹ *El. Rev.*, 88 (1921), p. 169.

rather than administer and act until the purchase rights over company undertakings, which were to be transferred to the Authority, could be exercised. Later, however, the "Conference" agreed that all stations should be operated under the direction of the J.E.A.³⁰

The companies objected to any rigid de-limitation of the functions of the new J.E.A. They proposed to give it one single duty, namely to consider as soon as possible, the existing organisation for the supply of electricity and to take such steps as appeared necessary for its improvement. The scheme of the "Joint Committee," therefore, authorised the J.E.A. to exercise all or any of the powers conferred by legislation, postponing the vital decisions until after the formation of the Authority. It must be doubted whether this would have been very satisfactory, as an unwieldy body comprising possibly 62 members, practically all representatives of existing undertakers, could not be expected to equip the new authority with over-riding powers to enforce a common scheme.

The most important feature of the "Joint Committee's" scheme, however, was that it provided for the creation of executive committees to whom all powers except that of borrowing or purchasing undertakings should be delegated. The Authority would have to appoint a Finance Committee and a Technical Committee, each consisting of five members, namely a chairman appointed by the L.C.C., two members representing those local authority undertakers, and two members of those company undertakers who had provided financial assistance to the Authority. All financial powers and duties would have to be delegated to the Finance Committee and no expenditure exceeding £1,000 could be incurred without their recommendation. The technical scheme was to be carried out on the advice and in consultation with the Technical Committee. Obviously the real power in the new J.E.A. would vest in these Committees, which were, in effect, responsible only to those undertakers who had invested capital in the new body.

In the absence of a legislative settlement of the problems connected with the financing of the schemes, the proposals made were necessarily only tentative. The L.C.C. and "Conference" schemes were based on the assumption that the Electricity No. 2 Bill of 1920 would be re-introduced and passed into law, enabling the J.E.As. to

³⁰ *El. Com., Statement of Decisions*, p. 12.

issue stock and take up or grant loans. Every undertaker in the district was to be authorised to support the new body financially. The "Conference" suggested that the rates of the local authorities might be pledged as collateral security for the capital of the J.E.A.

The "Joint Committee" Scheme made no provision for financial powers and only stated that the expenses of the J.E.A. would have to be met out of the proceeds from the sale of electrical energy, State grants and contributions by anybody entitled thereto. It was understood that the companies were prepared to finance the Authority during the initial period up to a sum not exceeding £1,200,000.³¹ The amount of capital immediately involved would be relatively small owing to their suggestion that the generating stations should be leased to the J.E.A. for a rental equivalent to 7 per cent. of the cost of the station less depreciation. If this rental should appear unsatisfactory to either party it was to be open to them to establish by means of arbitration the fair market value of the plant at the time of lease. The lease was to be extended for 60 years, after which the plant would become the property of the J.E.A. without further payment. The proposed rental meant a generous compensation for the companies and was later reduced on the recommendation of the Commissioners, but in addition the Companies demanded an extension of tenure of their distribution powers for a period of 60 years.

The L.C.C. simply stated that the transfer would have to take place on terms to be agreed, but provided for a tribunal which would fix the compensation if the undertaker had suffered a monetary loss. The "Conference" Scheme allowed for compensation at the rate of original cost less depreciation, which sounded less favourable than the original 1888 conditions, but which was defended with reference to the high rate of obsolescence of plant.³²

It is possible that the companies would have been prepared to compromise on the actual terms of compensation if the extension of tenure on the distribution side had been accepted,³³ but whilst the L.C.C. agreed, the local authorities considered the guarantee of bulk supplies at prices not higher than the cost of independent generation sufficient and objected to any further concessions to private interests. The reluctance of the local authorities to defer the

³¹ *El. Com., 2nd Annual Report* (1921-2), p. 82.

³² *El. Rev.*, 89 (1921), p. 110.

³³ *Cf. El. Times*, 59 (1921), p. 623.

purchase date was partly due to their intention to take over themselves as quickly as possible the retail distribution of electricity, on the plea that the J.E.A., to whom the purchase powers of the L.C.C. and outside local authorities were to be transferred, would be required to devote its whole energy to the organisation of generation.³⁴

(e) *Recommendations of the Electricity Commissioners*

A public enquiry into the various schemes took place during June and July, 1921, and developed into a very complicated and lengthy discussion upon the merits and demerits of the proposals submitted; the Commissioners tried in vain to reach a generally acceptable compromise. Many present, including several witnesses, had no clear conception of the issues involved and appeared to some observers to be there only for purely obstructive purposes.³⁵ The statement of decisions of the Commissioners was issued in December, 1921, and incorporated the technical scheme to which reference has already been made.³⁶

As inter-connection of the principal generating stations in the area and the pooling of all the available modern plant was an essential factor for the success of the scheme, the co-operation of all the principal undertakers was vital. The Commissioners preferred the outright transfer, on reasonable terms, of generating plant to the Authority to a mere control over the working of the stations which they thought represented a maximum of annoyance with a minimum of efficiency.³⁷ Later experience, under the 1926 Act, proved that nominal local ownership can, under favourable circumstances, have satisfactory results, if both planning and operational control are concentrated in a central body.

Only a small number of stations should ultimately survive and these should vest in the J.E.A.; the remainder, of which about 50 would be gradually closed down, could be incorporated in the scheme under an appropriate system of control by the J.E.A. Referring to the far-reaching measure of agreement between the three main parties, the Electricity Commissioners expressed the hope that it would be possible to settle the terms of transfer of stations on an equitable basis.³⁸ They agreed to a substantial

³⁴ *El. Rev.*, 89 (1921), p. 110.

³⁵ *El.*, 87 (1921), p. 170.

³⁶ See *supra*, p. 162.

³⁷ *El. Times*, 60 (1921), p. 553.

³⁸ Cf. *El.Com. 2nd Report*, p. 81.

extension of tenure for the companies in the hope that a settlement would be more easily reached. No interference with the rights of the North Metropolitan Electric Power Supply Company or the bulk supply rights of the Metropolitan Elec. Supply Company was proposed, on the contrary, the supply powers of the J.E.A. would be delegated to them as far as their areas were concerned. The Commissioners suggested that authorised undertakers should find the funds for all extensions at their stations whilst such stations remained in their possession, and for any inter-connecting mains required before the proposed J.E.A. was in a position to act. The capital necessary for further inter-connecting mains and the erection of capital stations should be raised by the Authority.

Their recommendations were welcomed as a satisfactory provisional scheme,³⁹ provisional, because in the absence of compulsory powers, the financial proposals were rather vague. This was unavoidable, as the jettisoned financial clauses of the 1919 Bill had not yet been restored.

The companies through their "Joint Committee" opposed the decision as not fulfilling their condition that the whole of the financial control of the Authority should be in the hands of those members who provided the necessary capital or were responsible for it by guarantee or otherwise; they also objected to the Commissioners' proposal to tie the hands of the J.E.A. in advance, by compelling them in the technical scheme to undertake certain heavy capital expenditure.⁴⁰ The attitude of the companies stiffened with the withdrawal of the 1921 Electricity Bill, by which the very existence of Joint Electricity Authorities became problematical. They brought forward the argument that they could develop electricity supply on more economical lines, if left to their own devices, simply by an extension of the purchase date. This was the first sign of the disintegration which destroyed the regional reorganisation plan of the 1919 Act.

(2) *The Progressive Weakening of Central Control*

(a) *Independent Schemes for Municipal and Company Undertakings*

The deadlock reached during the enquiry, combined with the inability to make any progress with a really effective joint authority owing to the absence of financial powers, revived the interest in

³⁹ *El. Rev.*, 89 (1921), p. 841.

⁴⁰ Letter by Mr. Fladgate, *The Times*, 17-12-1921.

other reorganisation proposals. Already under the 1909 Act joint municipal boards and technical co-operation of companies were possible and the formation of a central co-operative authority had been advocated to take over the municipal generating stations and to initiate an amalgamation of the companies.⁴¹ This idea was again taken up by Mr. Tait, the chairman of the Metropolitan Electric Supply Company⁴², and by Mr. Fladgate, the chairman of the Joint Committee, who recommended the formation of two J.E.As. for London, one for the municipalities and one for the companies.⁴³

There were serious objections to the granting of the status of a J.E.A. to an amalgamation of private concerns, and even in London the creation of two largely independent but continually overlapping networks would have necessitated a duplication of plant and transmission lines and would be less economical than a single integrated scheme. However, even such an incomplete reorganisation was better than the *status quo*, and after the disappointing outcome of the 1921 enquiry a sub-committee of the "Conference" of Local Authorities began to work out a scheme of co-ordination of stations independently from what the companies were doing. The "Conference" proposed to constitute itself as a Joint Committee for taking over the generating side of the municipal undertakings and the linking-up of stations.

If such a municipal London body could be created, the local authorities were prepared to leave the company undertakers undisturbed until they were purchased by the L.C.C. in 1931. It should be noted that in contrast to their later attitude, the local authorities considered it necessary to combine the generating resources at least of the municipal undertakings, irrespective of the fate of the London companies.

The companies similarly favoured a separation of municipal from private undertakings. In a Bill proposed by the "Joint Committee,"⁴⁴ the preamble stated that the development of electricity supply in London would best be effected by the formation of a body representative of the local authorities for their area, and by centralising generation in the hands of another body representing the companies for their area.⁴⁵ The promoters sought power to

⁴¹ L. C. Robipson, *El. Times*, 53 (1918), pp. 273 ff.

⁴² *Ibid.*, 55 (1919), p. 184.

⁴³ *El. Rev.*, 91 (1922), p. 45.

⁴⁴ *London Electricity Supply Bill*, 1923.

⁴⁵ Quoted L.C.C., *Min. Proc.* (1923), I, p. 147.

purchase by agreement any generating station or main transmission line within the area, leaving the former owners to manage the works on behalf of the new company. The purchase rights of the L.C.C. were to be suspended until 1971, but in consideration of this a sliding scale of charges and dividends should be introduced for the benefit of the consumers.

Whilst both the local authorities and the companies agreed on a separation, the Bill was strongly opposed by the L.C.C., which suspected that one of the main purposes of the schemes was to place the companies in an independent position, free from interference by any J.E.A. which might be formed.⁴⁶ This would postpone public control without recompense or commensurate benefit to the public ; to segregate the two sectors of the industry without bringing them under the constant supervision of a controlling body would be opposed to the spirit of the 1919 Act. The only right way to tackle the problem was to constitute one single authority for London ; the L.C.C. refused to part with any of its powers except to a J.E.A. covering the whole area and capable of safeguarding the public interest.

(b) The First Draft Order

The Electricity Commissioners attempted to reach a compromise solution acceptable to all parties and published in February, 1923, a Draft Order incorporating the technical scheme adopted after the first enquiry and providing for the formation of a single J.E.A.⁴⁷

The outstanding feature of the Draft Order was the proposal to delegate virtually all important powers and functions of the J.E.A. to two committees, which were to be appointed immediately after the formation of the Authority, the one consisting of representatives of all the local authority undertakers within the electricity district and the other of the company undertakers within the Administrative County of London. Each committee should have wide powers in all questions regarding generation and transmission, bulk supply, management and operation of generating stations, and in the carrying out of certain portions of the technical scheme. The North Metropolitan Electric Power Supply Company and the Metropolitan Electric Supply Company were to be left practically independent from any interference by the J.E.A., which would only serve as an intermediary between these companies and the Commission-

⁴⁶ *Ibid.*, p. 148.

⁴⁷ *El. Com. 3rd Annual Report (1922-3)*, p. 24.

ers.⁴⁸ A large area on the outer fringe of the district would not be within the jurisdiction of either of the committees or the two companies, and, although this would not give rise to immediate technical difficulties, the L.C.C. felt strongly that the order should contain provisions regarding the control and development of those mainly rural areas.⁴⁹

To safeguard the interests and the development of the district as a whole against any parochial tendencies of the various autonomous groups, the scheme provided for an independent Advisory Technical Committee, the majority of which need not be members of the J.E.A. Its function was to advise on technical matters affecting the whole area or where co-ordinated action between the groups was needed, but should have no over-riding power over the supply undertakers.

The key-note of the scheme was compromise, and "compromise rather hoped for than accomplished." The process of concentration and unification would at best, be slow, and, owing to the weakening of the central Authority, difficult.⁵⁰ In the words of the judge to whom the Draft Order was submitted: "To get over the objection made by the L.C.C. to having more than one district and more than one authority for London, and the objection of the undertakers within the district to having only one, the Commissioners have propounded this scheme which, whilst in name providing for one Electricity Authority, in fact, provides for two, each with its separate district and independent power."⁵¹

The companies for whose benefit this compromise had largely been drawn up, opposed the scheme and claimed that the provision requiring the appointment of certain committees and the delegation of functions by the Joint Authority was *ultra vires*, i.e. not authorised by the 1919 Act. They went to Court and obtained a decision by which the Commissioners were precluded from proceeding further with the Draft Order in its original form.⁵²

(3) *The Final Emasculation of the J.E.A.*

(a) *L.C.C. Agreement and New Draft Order, 1924*

In order to overcome the new deadlock, the L.C.C. and the

⁴⁸ *El. Rev.*, 92 (1923), p. 241.

⁴⁹ *L.C.C., Min. Proc.*, 1923, II, p. 262.

⁵⁰ *El. Rev.*, *loc. cit.*

⁵¹ Quoted *El. Times*, 64 (1923), p. 108.

⁵² *El. Com. 4th Annual Report* (1923-4), p. 29.

London companies entered into negotiations which led to a settlement accepted in an L.C.C. Resolution.⁵³ On this basis the Commissioners published a second Draft Order in March, 1924, but as the terms of settlement were such that complete effect could not be given to them by means of an Order alone, two Bills were at the same time promoted by the London companies to supplement the scheme.⁵⁴

The special L.C.C. Committee on London Electricity Supply, in proposing the Council's resolution, emphasised that the settlement met the particular points for which the Council had fought throughout, namely adequate power of control by the J.E.A. in such essential matters as technical development, capital expenditure and maintenance of assets ultimately to be transferred, but provided for a very large measure of autonomy for the companies.⁵⁵ The Draft Order gave them practically complete administrative and financial independence, an extension of tenure from 1931 to 1971 and the permission to amalgamate. In return for these substantial concessions, the companies accepted the establishment of a single Joint Electricity Authority, which would eventually take them over, and submitted to a regulation of their profits by means of a sliding scale of dividends and prices.⁵⁶ The Authority's immediate powers of control were to be practically restricted to the local authorities and, in consequence, the companies' representation on the Board was reduced.

The Draft Order provided for the J.E.A. to take steps to ensure the effective execution of the technical scheme in the local authority areas and to acquire by transfer or lease certain generating stations belonging to local authorities. The Bills allowed for the centralisation of generation in the companies' areas without any appreciable interference from the Joint Authority, but the companies were under the obligation to carry out the technical scheme which formed an essential part of the Order.

(b) Opposition by the Local Authorities

The London Labour Party issued a Memorandum against the proposed settlement and objected to the extension of tenure without

⁵³ L.C.C., *Mm. Proc.* (1923), II, p. 348.

⁵⁴ Will's, *Law Relating to Electricity Supply*, 6th Edition (1932), p. 87.

⁵⁵ L.C.C., *loc. cit.*, p. 349.

⁵⁶ *El. Com. 4th Annual Report* (1923-4), p. 29.

an adequate protection of the consumer.⁵⁷ The Party opposed any private legislation calculated to strengthen the grip of private monopoly at a time when the Labour Government was considering general legislation for the reform of electricity supply on the basis of public ownership of generation and distribution.⁵⁸

The local authorities also did not agree with the proposals and adopted a rather hostile attitude at the public enquiry which commenced in May, 1924.⁵⁹ They objected to any transfer of generating stations to the J.E.A. and claimed that both the technical scheme and the proposed Technical Advisory Board were *ultra vires*. They insisted upon an emasculated technical scheme and would not make up their minds as to whether they would transfer their stations to a J.E.A. ; they even asked the Commissioners to cut out any reference to the inter-connection of stations.⁶⁰ In order to avoid further delay, the technical scheme was altered and all the compulsory features were removed ; no local authority would be forced into the scheme.⁶¹ The Technical Advisory Board was made permissive and it was left to the J.E.A. to report to the Commissioners within 12 months upon the technical scheme without being compelled to adopt it.⁶²

This modification of the Draft Order made the scheme almost entirely permissive. In view of the earlier readiness of the local authorities to form a joint co-ordinating body for the municipal areas, whatever happened about the companies, this further weakening of the powers left to the J.E.A. can only be considered as another sign of strengthened parochial individualism, encouraged by the companies' success in avoiding any effective central control of their undertakings.

(c) *The 1925 Settlement*

Meanwhile the two London Electricity Supply Bills continued their progress through Parliament. In the Commons debate the Labour Party attacked the London County Council for rushing through their agreement with the companies just before an L.C.C. election, and complained that the Bills which granted private enter-

⁵⁷ Mem. "London Threatened by Electrical Trust."

⁵⁸ *El.*, 93 (1924), p. 134.

⁵⁹ *El. Com. 5th Annual Report (1924-5)*, pp. 15-17.

⁶⁰ Sir J. Snell, quoted *El. Times*, 65 (1924), p. 603.

⁶¹ *Ibid.*, p. 523.

⁶² *Ibid.*, p. 572.

prise complete control over the distribution side for a considerably extended period, included very few compensating advantages for the public and provided safeguards of doubtful value.⁶³ The Minister of Transport maintained that the arrangements would save the L.C.C. the cost of buying out the companies at the high prices likely to reign in 1931 and that the technical control by the J.E.A. over the companies' development policy would be of great importance.⁶⁴

In July, 1925, the measures constituting the complete scheme obtained Parliamentary sanction, namely

- (1) The *London and Home Counties Electricity District Order*, 1925, which in its schedule constituted the J.E.A. and gave the main outlines of the technical scheme.
- (2) The *London Electricity (No. 1) Act*, 1925,⁶⁵ which incorporated the settlement for the four East London companies, viz. the County of London Electricity Supply Company, the City of London Electric Lighting Company, the South Metropolitan Electric Light and Power Company, and the South London Electric Supply Company.
- (3) The *London Electricity (No. 2) Act*, 1925,⁶⁶ for the ten West End companies joined in the London Electricity Joint Committee (1920) Ltd.

The two Acts gave statutory force to the agreement between the L.C.C. and the companies, and the various agreements amongst companies themselves, and included those parts of the scheme which required special legislation.

The most important positive result of the settlement, reached after many years of debate and controversy, was the formation of the London and Home Counties Electricity District with a technical scheme for the inter-connection of plant and the gradual concentration of generation in a number of principal stations. The J.E.A. had a moral responsibility for the execution of the scheme, although its powers of enforcing it were severely restricted. It had to report to the Commissioners on the technical schemes within 12 months without having to adopt it and generally had to act as a co-ordinator of practically independent undertakings. The Authority has the

⁶³ *Parl. Deb.*, H.C., 19-2-25, V. 180, c. 1412 ff.

⁶⁴ *Ibid.*, c. 1427.

⁶⁵ 15 and 16 Geo. V. ch. 62.

⁶⁶ 15 and 16 Geo. V. ch. 63.

right to submit observations to the Commissioners on any extensions of company plant and where expenditure exceeds £5,000 and will not be repaid before 1971, its assent is required. The success of the Authority depended, therefore, on its ability to persuade the various undertakers to follow a common policy, with the result that it could not attempt any measure which would offend strong sectional interests.

The J.E.A. had a further important function, namely that of acting as an intermediary between local undertakers and the Commissioners, and of holding a watching brief in the interest of the consumer. In this capacity it could make representations to the Commissioners on matters of efficiency.⁶⁷ In addition the J.E.A. was granted certain permissive powers, such as the right of taking or giving bulk supply,⁶⁸ of acquiring generating stations or whole undertakings by agreement,⁶⁹ of constructing power stations,⁷⁰ and in the course of time it succeeded in building up a considerable range of activities.

The Report on the technical scheme was submitted by the J.E.A. to the Electricity Commissioners later than expected and was mainly concerned with the development of the Western portion of the district, proposing the establishment of a new power station at Chiswick. The Commissioners complained that it envisaged a system of loose-linking, but did not formulate proposals for a co-ordinated development of the various parts of the district,⁷¹ for obvious reasons, as this would have been too controversial to find general approval. The J.E.A. recommended the formation of a small Technical Advisory Committee to prepare a more comprehensive scheme and asked the Chief Engineers of the principal undertakings to serve on this Committee. The engineers, however, felt unable even to accept the invitation, and the idea had to be abandoned.

As the North Metropolitan Electric Power Supply Company and the Metropolitan Electric Supply Company were practically outside the operational area of the J.E.A. and could proceed with independent schemes of development, many local authorities became

⁶⁷ *London El. Ord. Schedule*, s. 18.

⁶⁸ *Ibid.*, s. 21.

⁶⁹ *Ibid.*, s. 12 and 20.

⁷⁰ *Ibid.*, s. 23.

⁷¹ *Fl. Com. 7th Report* (1926-7), p. 134.

seriously concerned that the companies would thereby acquire a virtual stranglehold over municipal undertakings,⁷² and demanded to be included in the J.E.A. area proper or to be left out of the scheme altogether. When the Conference of Local Authority Undertakings threatened to oppose the whole settlement if this was not accepted,⁷³ the Commissioners, after some hesitation, granted substantial protection to the local authorities affected.

Most local authorities, including a number of Metropolitan Boroughs, were authorised to obtain direct bulk supply from the J.E.A. without reservation.⁷⁴ In some cases the right was subject to the consent of the Commissioners,⁷⁵ after giving any company with statutory powers of supply in the particular area a hearing. In other parts of the electricity district the Commissioners could permit the J.E.A. to supply only if satisfied that such supply could be given more cheaply and economically by the J.E.A. than by a power company with supply powers.⁷⁶

The creation of the Central Electricity Board as the supreme bulk supply authority under the 1926 Act, while reducing the prospect of power company control, at the same time diminished the usefulness of the J.E.A.

The South-East England scheme superseded the J.E.A. proposals, as far as generation and main transmission are concerned, but provided for the construction by the J.E.A. of secondary transmission lines and transformer stations supplementary to the primary grid transmission system.⁷⁷ The Authority persevered with its plan of co-ordinating the municipal generating stations, and a Joint Committee of the Authority and the Conference of Local Authorities owning electricity undertakings in the area formulated a draft scheme. It proposed to transfer all stations to the J.E.A. which, as the co-ordinating authority, would be responsible for raising the necessary capital, but provided that all other powers and duties would be exercised by a Management Committee of the station owners and the J.E.A. The Electricity Commissioners objected to this scheme as placing upon the Authority complete financial responsibility for capital and working costs of the transferred

⁷² *El. Times*, 65 (1924), p. 523.

⁷³ *Ibid.*, p. 609.

⁷⁴ *London Electricity Order*, Schedule, s. 13.

⁷⁵ *Ibid.*, s. 15.

⁷⁶ *Ibid.*, s. 14, 16, 17.

⁷⁷ *8th Electricity Commissioners' Report* (1927-8), p. 25.

stations without granting it corresponding complete financial control. The Central Electricity Board were opposed to a combination of municipal generating stations and transmission lines "for reasons which were not regarded by the Joint Committee as satisfactory."⁷⁸ As in addition a number of local authorities did not agree with the proposal, it was not proceeded with further.

A less ambitious scheme was initiated by which the generating stations of 14 undertakings, such as Epsom, Finchley, Hammer-smith, Kingston, etc., were to be operated in accordance with the requirements and at the instruction of the J.E.A. in conjunction with the C.E.B.

All these stations were non-selected stations, largely independent from the Central Board, but by this pooling arrangement an additional measure of centralised control was achieved for the benefit of London electricity supply.

In retail distribution the powers granted to the London J.E.A. were restricted, at least for the immediate future. The Authority could not supply in the areas of existing undertakers without their consent, but was made responsible for the advancement of undeveloped areas and had to submit suitable proposals to the Commissioners within two years.⁷⁹ The right to acquire whole undertakings by agreement widened the scope of distribution and this has enabled the Authority to take over retail distribution in a relatively large district of 190 square miles with a population of 310,000. Considerable progress has been made and between 1931 and 1941 the number of consumers rose from 40,700 to 138,550, and consumption from 32 to 205 million units.⁸⁰

In accordance with the agreement between the London companies and the L.C.C., the purchase rights of the Council were transferred to the J.E.A., which will eventually become responsible for the retail distribution in the areas occupied by the London companies. The areas supplied by local authorities remain unaffected and no general provision has been made, in spite of the promise in Sec. 13 of the 1919 Act, for the transfer of the purchase rights of local authorities outside the County of London.

After agreement in principle by the majority of the local authorities concerned, the Authority promoted a Bill in 1929 for

⁷⁸ *9th Electricity Commissioners' Report* (1928-9), pp. 151 ff.

⁷⁹ *London El. Order*, Schedule, s. 16.

⁸⁰ Details kindly given by Mr. Leslie Gordon, Clerk and Solicitor to the J.E.A.

transferring the purchase rights from local authorities to the Authority. Amongst other things, the Bill contained provisions enabling the Authority to arrange equated dates for the purchase of undertakings, for the creation of distribution areas, and the establishment of local advisory committees, composed of representatives of local authorities and the Joint Electricity Authority, to advise the Authority on matters connected with the development of electricity supply services.

A group of the London companies opposed the Authority's proposals, and succeeded in obtaining a decision of the High Court to the effect that the Authority had no power to expend any part of its revenue on the promotion of such a Bill. By this means the Authority was effectively restrained from proceeding with the Bill.

As the decision of the Court revealed a weakness in the Order constituting the Authority, the Authority sought the advice of the Minister of Transport on the general position. Acting upon the Minister's advice, the Authority attempted to put into operation the provisions of Sec. 13 of the Electricity (Supply) Act, 1919, and applied for a series of Orders to be made by the Electricity Commissioners, transferring to the Authority the purchase rights of local authorities over electricity supply undertakings in a number of the areas forming part of the London and Home Counties Electricity District, and for the establishment of advisory committees for each area, composed of representatives of the Authority and of local authorities. Two Orders of this kind were made and approved by Parliament in 1931 and 1932. By these, the purchase rights of a number of local authorities in Middlesex and Surrey were transferred to the Joint Electricity Authority. With these powers vested in it, the Joint Electricity Authority was able to acquire the undertakings in these areas by agreement with the companies, without the actual exercise of the purchase rights. In another area, agreement was reached between the Joint Electricity Authority, the local authorities, and the companies concerned, under which the companies promoted an Act of Parliament, the effect of which was to equate a number of different purchase rights, to transfer the purchase rights so equated to the Joint Authority, and to transfer the undertakings upon the expiration of the equated period to the Authority. The Bill received Parliamentary sanction in 1936. In other areas, the Authority promoted proposals, the purpose of which was not to obtain immediate ownership of the undertakings con-

cerned, owing to local difficulties, but to provide for an equation and extension of purchase rights, and the transfer of the undertakings which were subject to purchase rights, as well as undertakings which were not subject to purchase rights, at the end of an extended tenure, the proposals providing for a general control of prices and dividends, capital expenditure and development in the meantime.

The success of the Authority in these proposals was limited. Eventually, further proposals were practically stopped upon the appointment of the "McGowan Committee" by the Minister of Transport in 1935, with the object of bringing under review the organisation and distribution of electricity in Great Britain. The possibility of new general legislation on the subject appears to have been the reason for the refusal on the part of the Electricity Commissioners to approve other Orders for which application had been made by the Authority.

At the present time, therefore, the position within the London and Home Counties Electricity District is that approximately 75 local authorities may eventually exercise something like 140 purchase rights, exercisable over about 26 distributing companies. Most of these rights mature on different dates, and on varying terms, many of them in the immediate future.

An important part of the 1925 settlement was the reorganisation of the London companies. The restrictions imposed on amalgamation within the County of London (which had become senseless from the moment the L.C.C. was purchasing authority for the whole area) were removed and the companies encouraged to enter into agreements with each other for amalgamation, acquisition, combined working of undertakings or transfer to new companies, subject always to the approval of the Commissioners.⁸¹ The No. 1 Act provided for the amalgamation of the four East London companies, whereas the No. 2 Act arranged for the lease of the generating stations and main transmission lines of the 10 companies forming the London Electricity Joint Committee to a new body, the London Power Company.⁸²

The lease of stations was completed by 1928 and the Company obtained permission to erect a new selected station at Battersea.

In addition six of the West End companies made a Management Agreement in 1934 for the co-ordination of distribution in the shape

⁸¹ *No. 1 Act*, Clause 9; *No. 2 Act*, Clause 8.

⁸² *No. 2 Act*, Clauses 9-12.

of a new company, the London Associated Electricity Undertaking Ltd., which led later, in 1937, to a complete amalgamation in the Central London Electricity Ltd. The amalgamation of the East London companies was carried out more slowly and is not yet completed.

The most important concession to the companies was the postponement of the purchase date by 40 years, to the 31st December, 1971.⁸³ Both the new Barking station and the London Power Company were included in the purchase agreement.

The terms of transfer were fixed on the following basis :—

- (a) Physical assets such as land, buildings, works, machinery and other apparatus forming part of the undertaking at the time of establishment of the J.E.A., were to be transferred to the Authority free of charge.⁸⁴ For this purpose the companies had to set aside annually sufficient sums for a sinking fund "A" to liquidate the existing physical assets transferable to the Authority.⁸⁵
- (b) Physical assets provided subsequent to the establishment of the J.E.A. were to be transferred against payment of a sum "equal to the amount expended in providing such assets . . . less the amount standing to the credit of sinking funds 'B'"⁸⁶ This was a fund sufficient to liquidate within periods fixed by the Commissioners the costs of any assets provided by the companies,⁸⁷ the periods varying between 7 years for appliances and 60 years for land.⁸⁸
- (c) Stock-in-trade and stores were to be sold to the J.E.A. at agreed prices or, failing such agreement, at values determined by a valuer.⁸⁹

The purpose of this detailed regulation is to determine within narrow limits the price which the J.E.A. will eventually have to pay for the transfer of the company undertakings, to place the depreciation allowances of all companies on a uniform basis and to encourage an active policy. That a large part of the assets will eventually be transferred to the J.E.A. free of charge, does not, of

⁸³ *No. 1 Act*, Clause 4; *No. 2 Act*, Clause 28.

⁸⁴ *Agreement*, Clause 6 (1).

⁸⁵ *Ibid.*, Clause 7 (1).

⁸⁶ *Ibid.*, Clause 6 (2).

⁸⁷ *Ibid.*, Clause 7 (II).

⁸⁸ *El. Com. 7th Annual Report* (1926-7), p. 133.

⁸⁹ *Agreement*, Clause 6 (3).

course, constitute a sacrifice on the part of the companies, as the sinking funds to be accumulated out of revenue will be retained by the companies when the undertakings are handed over, to ensure the repayment of the capital to shareholders.

The extension of tenure was, in the eyes of some critics, an excessive concession to the London companies in view of their record of high charges and high profits in the past. Complaints had been raised about their "high prices, bureaucratic methods and general failure to realise public requirements";⁹⁰ and it was pointed out that London inhabitants had little to thank them for.⁹¹ A safeguard of the consumers' interests was admittedly necessary and the companies agreed to a regulation of their dividends on the basis of a sliding scale relative to prices. "Standard prices" were fixed so as to cover the costs and charges of the companies, including their contributions to the sinking funds and the amount of dividends paid on ordinary shares for the year 1922 with appropriate allowances for new capital investments. The amount included for ordinary dividends could alternatively be fixed at 10 per cent. on the nominal amount of paid-up share capital and should in no case be less than 10 per cent. on the nominal amount of ordinary share capital outstanding at December, 31st 1922.

The standard prices were subject to the approval of the L.C.C. and the Electricity Commissioners, and were to remain in force until 1931. After that date new standard prices were to be established on a similar basis, but allowing the reduced amount of 7 per cent. on the nominal amount of paid-up capital plus 7 per cent. on ordinary capital created by the capitalisation of free reserves. The J.E.A.'s approval was necessary for the new scale of standard prices. If in any year the total of the amounts actually charged to consumers for current supplied were less than the amount arrived at by applying the appropriate standard prices to the number of units supplied during the year, the difference between the two total sums must be regarded as "consumers' benefit," and, subject to a balance of revenue being available for the purpose, a sum equal to one-sixth of that difference could be used for the purpose of paying additional dividends to ordinary shareholders, or for the accumulation of reserves. A balance of profits equal to one year's interest on the

⁹⁰ *El.*, 92 (1924), p. 314; cf. *El. Rev.*, 92 (1923), p. 162.

⁹¹ *El.*, 93 (1924), p. 2.

preference capital and dividends at the standard rates on the issued ordinary capital could be carried forward.

The introduction of a sliding scale had as its purpose the provision of an incentive to efficiency by allowing a small but proportionate increase in dividends for any reduction in charges. The question arises to what extent the arrangements under the 1925 Acts achieve this object. The amount included in the standard prices for dividends was fixed at 10 per cent. until 1931 and at 7 per cent. thereafter. Whether a profit at this rate was fair or excessive formed the subject of considerable controversy, for it was claimed that the percentage was to be paid on a capital inflated by the capitalisation of free reserves, whereas the payment on capital expended might be twice as much.⁹² But insofar as standard prices and dividends were lowered after 1931, consumers could expect at least some benefit from the settlements.

The mechanism of a sliding scale is designed to encourage reductions in the charges for electricity, but the J.E.A. pointed out in a report on the Acts that "it does not necessarily follow that the advantage of such developments would be enjoyed equally by all classes of consumers as in the calculation of receipts for the purpose of ascertaining any permitted increase in the dividends or retainable profits, totals for all consumers are taken, whereas for the purpose of standard prices, the consumers are divided into four classes: (a) Railway and traction; (b) bulk supplies; (c) street lighting; (d) private consumers."⁹³

A cheap supply of electricity in bulk may bring the average price well below the rate justifying an increase in dividends, although the large majority of the company's direct consumers may not derive any benefit from this reduction. Supply in bulk and for traction is the most competitive part of electricity supply and prices are likely to be governed more or less by competition. In order to render the sliding scale system more beneficial to private consumers, it would need to be based only on a comparison of prices and standard charges applicable to that class of user.

Unfortunately, owing to the special conditions of electricity generation, it is very difficult, if not impossible, to establish the exact cost of current for any particular class of user.

⁹² *El. Rev.*, 101 (1927), p. 890.

⁹³ *El. Com. 9th Annual Report* (1928-9), p. 147.

(4) *The Prospect for the Future*

If the 1926 Act very largely superseded the generating functions of the J.E.A., recent proposals for the reorganisation of the distribution side of the electricity industry do not accept the arrangement under the 1925 Acts for the eventual transfer of the Company distribution rights to the Authority.

The McGowan Committee was not satisfied that the Greater London area, with its vast population and its many different characteristics, was a suitable area to be administered as one (paragraph 269); it would be necessary to organise the district into a number of sub-areas with a substantial devolution of power to maintain local contact and to ensure the right type of development (paragraph 271). It therefore recommended a reorganisation on the lines of amalgamation of neighbouring undertakings (paragraph 273).

The Government White Paper on Electricity Distribution, 1937, proposed to split up the J.E.A. area into five districts with 18 groups and sub-groups of very unequal size and character. Fulham with 2.6 square miles, Battersea and Hammersmith with 3.5 square miles each would remain separate administrative units, whilst the whole area of the Northmet Company would form a single unit. It is difficult to avoid the impression that the suggestion was formulated more with an eye to political acceptability than for the purpose of creating technically satisfactory electricity areas.

A plan for the County of London put forward by Mr. E. Jesty⁸⁴ appears to be more satisfactory in that it proposes a grouping into areas of at least 8 square miles. By restricting the proposal to the County of London the problem of joining rural to urban areas in the interest of load diversity and rural development did not arise.

In contrast to these proposals the London and Home Counties J.E.A. itself suggested the formation of a single district board covering the area of the present J.E.A. or that of the South-East England district of the C.E.B. All undertakings in the area should be transferred to this board within a short period.

The future of electricity supply in London will be decided as a part of the future organisation of electricity supply in the country as a whole, which will be discussed in detail in a later chapter.

⁸⁴ *El. Rev.*, Vol. 133 (1943), p. 230.

III. CONCLUSIONS

The impact of later developments renders it very difficult to form a clear judgment on the value of the 1925 legislation. The originally most important part, the technical scheme introducing for the first time a coherent development policy for the whole of Greater London was never able to prove its usefulness, as it was soon superseded by the wider and more comprehensive national reorganisation under the Central Electricity Board. The formation of that Board also affected seriously the position of the newly-created Joint Electricity Authority, whose primary function, the co-ordination of generation and main transmission, was thereby largely rendered superfluous. The value of the positive contribution made by the London undertakers, namely the voluntary acceptance of a common technical scheme, was completely eclipsed by the universal compulsory inter-connection of stations in the grid system.

These factors render it almost impossible to draw any but unbalanced conclusions, fastening on the shortcomings of the scheme (which remained) and forgetting about the benefits which might have been achieved had the settlement been undisturbed by later developments. Making every allowance for this tendency to err in the direction of excessive criticism, the story of the struggle for a Greater London J.E.A. corroborates the general conclusions drawn in the previous chapter.

If concentration and co-operation within an industry does not hold out any prospect of gain to all its members, but means a loss of independence or status, any measure of co-ordination will be opposed by those whose independence or status are threatened, even though they admit the necessity of reorganisation.

Reliance on voluntary agreement without at least the threat of compulsion is, therefore, likely to lead to disappointment; for, as soon as the danger of compulsion recedes, the willingness to join forces weakens and individual or parochial egotism triumphs.

Had these truths been recognised by the various governments interested in electricity reform, a period of frustration and wasted efforts lasting more than 25 years might have been considerably shortened, if not entirely avoided.

CHAPTER VIII

NATIONAL REORGANISATION OF GENERATION AND TRANSMISSION

I. THE NEED FOR A NATIONAL SCHEME

FOR the reasons already indicated, the policy of voluntary reorganisation on a regional basis had failed, despite the Acts of 1919 and 1922 and more favourable business conditions. It became increasingly clear that further legislation would be necessary to bring about the reorganisation desired, but opinions regarding the best solution of the problem were as divided as ever. The call for compulsory powers for the Electricity Commissioners was fiercely opposed by those who still believed in self-help by the industry itself, without any interference from outside.

Progress in the actual supply of current—even rapid progress—had been made, as is shown by the growth of total energy generated by authorised undertakers from 4,384,000,000 units in 1920-1 to 6,698,000,000 units in 1925-6, an increase of about 57 per cent.¹ The average revenue per unit sold fell from 5.75d. to 3.82d. for lighting, from 1.69d. to 1d. for power, and from 2.48d. to 1.65d., that is by over 33 per cent., on all classes of supply.²

The Commissioners could report a steady concentration of generating plant in larger stations and an improvement in the efficiency of individual plants.³ Most notable was the rapid growth and high efficiency of the medium-sized stations which could justify their existence, if inter-connected with other stations.⁴ The obstacles which had obstructed development in the early post-war period,

¹ *El. Com. 6th Annual Report* (1925-6), p. 7.

² *Ibid.*, 7th Report (1926-7), p. 19.

³ *Ibid.*, p. 8.

⁴ H. Quigley, *National Progress and Electric Power* (1925), pp. 138, 143.

namely high cost of capital and equipment, had disappeared and the fall in the rate of interest and in prices enabled undertakers to embark upon substantial developments.⁵

Progress, however, was by no means even and was mainly due to the efforts of the larger undertakings, whereas about two-thirds of the country was supplied by small stations incapable of generating electricity at a price low enough to encourage consumption on a large scale.⁶ In many districts only very slight efforts were made to secure the great flood of business that was expected, and there were still areas with no supply of electricity at all. In the absence of Regional Authorities, the progress made was the result of individual rather than co-operative development, in spite of all the endeavours of the Electricity Commissioners.⁷ Out of 438 generating stations in existence by 1925, 28 generated 50 per cent. of the total energy, while 322 stations together only supplied 11 per cent.⁸

After 1919 it was no longer possible to blame legislation for the unsatisfactory state of affairs. Mr. (now Sir) Archibald Page considered the rivalry between the larger supply authorities and an over-zealous display of local patriotism by the smaller municipal undertakers the real reason for the persistence of out-of-date methods of production.⁹ The intense municipal feeling militated against any reform which would destroy local autonomy; as Mr. Lloyd George stated in Parliament, there is a price upon every other vested interest, but the price of human vanity is prohibitive. Chairmen and engineers will fight to the last against having their own particular child—the local power station—taken away.¹⁰ The call for vigorous reform of electricity supply, which had been temporarily silenced by the promises of voluntary reorganisation of the industry, gained anew considerable urgency and political importance.

On the technical side the trends noticeable since the beginning of the century had become still more marked: the greater economy of large-scale generation and inter-connection of plant was an

⁵ *El. Com. 3rd Rep.* (1922-3), p. 5.

⁶ H. Quigley, National Supply of Electricity, *Financial Times*, 21-1-26.

⁷ Cf. *El. Com. 3rd Report*, p. 32; *4th Rep.*, p. 14; *5th Rep.*, p. 53; *7th Rep.*, p. 22.

⁸ *Weir Report* (1927), s. 27.

⁹ Pres. Address, *J.I.E.E.*, 66 (1928), p. 5.

¹⁰ *Parl. Deb.*, H.C., 21-5-25, Vol. 184, c. 738; cf. also Mr. Snowden, H.C., 30-7-24, Vol. 136, c. 2106.

established fact, although the advantage in capital and operating expenses could sometimes only be appreciated by taking the long view and examining the problem from a national as well as from a local point of view.¹¹ A parochial outlook necessarily ignored the technical considerations essential for a cheap supply of electricity.¹²

The technique of transmission had made rapid progress, and allowed an economic supply over 200 or even 300 miles.¹³ A technical co-ordination of the electricity supply undertakings in the whole of Great Britain on a national scale had thus been made possible and was stated to promise similar economies to those obtained by the local connection of stations.¹⁴

The Weir Committee claimed in 1925 that the seven years which had elapsed since the Williamson Committee's Report, had produced almost complete evidence that this further degree of inter-connection between areas was the *sine qua non* of any really effective electrical system in a heavily populated industrial country¹⁵; the evidence was mainly based on the experience of the Newcastle Company and its subsidiaries operating on the North-East coast. The expected economies would be achieved (a) by a reduction in capital expenditure, (b) by savings in the cost of operation, especially in fuel, (c) as a result of the increased load in undeveloped areas.¹⁶

National inter-connection of generating stations was not universally accepted as a necessity. The compactness of the country, where very few centres were far removed from coalfields, and where cheap, easy transport tended to equalise fuel costs; the obvious division of the country into eight major industrial areas made, in the eyes of critics, any system of mains connecting widely separated areas unnecessary, in contra-distinction to countries where water power or coal was only available in a few remote localities.¹⁷

The question was very thoroughly investigated later, on the occasion of the North-East England scheme, when the advantages

¹¹ A. Page, *loc. cit.*, p. 4.

¹² M.O.T. Rep. of Com. to Review the National Problem of Supply of Electrical Energy (*Weir Report*), Stationery Office (1927), s. 17.

¹³ H. Hoover, *Transactions of the First World Power Conference*, London (1924), Vol. IV, p. 1582.

¹⁴ J. R. Beard, *Transmission and Distribution*, *J.I.E.E.*, 65 (1926), p. 340; cf. G.H., *Socialisation of Electric Supply Industry* (1934), p. 14.

¹⁵ *Weir Rep.*, *loc. cit.*, s. 23; cf. H. Quigley, *loc. cit.*

¹⁶ *Weir Rep.*, *loc. cit.*, s. 24.

¹⁷ *El. Rev.*, 96 (1925), p. 644; *ibid.*, 98 (1926), p. 121.

of inter-connection of the North East coast area with the rest of the country had to be weighed against the high cost of frequency standardisation, which would have to be incurred. The practically unanimous decision reached by experts and the Central Electricity Board was that, in spite of this expenditure, the inter-connection was to the mutual advantage of the local area and the country as a whole.¹⁸

II. CENTRALISED CONTROL OF GENERATION

(1) *Plans and Politics*

The idea of a national system of electricity supply was not new ; the recommendations of the Williamson Committee, 1918, and the original 1919 Bill, before it was emasculated by Parliament, provided for effective powers of central planning and control. In 1919 the plea had been accepted that compulsory powers were unnecessary, but the results dashed all hopes in an advance by voluntary reorganisation.

The obvious and seemingly least controversial remedy was to grant the Electricity Commissioners compulsory powers to enforce the formation of Joint Electricity Authorities, a solution implicit in the previous legislation and designed to secure a high degree of regional autonomy.¹⁹ The Commissioners urged that only with the establishment of a central body such as a J.E.A., but endowed with adequate executive and financial powers, could a comprehensive reorganisation be carried out.²⁰ In 1924 Mr. P. A. (now Sir Percy) Harris introduced a Bill in Parliament²¹ to increase the power of the J.E.As., which provided for compulsory acquisition of generating stations. The proposal only covered a very small part of the field and was, therefore, not acceptable to the Labour Government.

To render regional co-ordination effective as a part of a national scheme it was probably necessary to revert to the original 1919 Bill, placing the initiative for the formation of regional bodies in the hands of the Electricity Commissioners. The creation of District Boards, which had been opposed as "the first step towards the

¹⁸ C.E.B., *2nd Annual Report* (1929), p. 3.

¹⁹ Cf. *El.*, 92 (1924), pp. 126, 746; *El. Rev.*, 93, p. 429; *Mun. Journal*, 1926, p. 505; *Econ.*, 100 (1925), p. 1064.

²⁰ *El. Com. 4th Annual Report* (1923-4), p. 14.

²¹ Bill 162, B.P.P. (1924), I, p. 957.

complete nationalisation of the electricity supply industry,"²² might appear a clumsy, inefficient and even out-of-date solution, as it was likely to establish regional interests as a time when national inter-connection was becoming accepted as the primary aim of reorganisation.

As a result of the experience of the last few years faith in joint boards was shaken and opinion veered more towards the idea of entrusting the whole generation of electricity to some national body "free from local politics and that rather short-sighted private enterprise of which there are too many examples in the electricity supply industry."²³

Outright nationalisation was bound to arouse the opposition of all those objecting to the idea of Socialism, and the fear was expressed that it would prove fatal to progress in a rapidly developing industry under a system of control fearful of risks which are inseparable from commerce.²⁴

The Weir Committee opposed any scheme of centralising the ownership of generating stations in the hands of one board: "Apart altogether from the difficulties which would attend the compulsory purchase of existing stations, and the delay involved in the change of ownership, it is clear that this alternative would lead to the creation of a huge and unwieldy organisation. It might lead to stereotyped practice, check development and progress, remove incentive from the officials and tend to bureaucratic administration. . . . There would be a sharp cleavage between generation and distribution which might lead to lack of co-ordination between manufacture and demand."²⁵

The chances of nationalisation became more favourable when the Labour Government came into power in 1924. The Government was dependent, however, upon the support of the Liberals and had no clear-cut programme for the reorganisation of electricity supply. A resolution proposed by the London Labour Party and adopted at the Annual Party Conference in 1924 pronounced in favour of general legislation involving either nationalisation of the generating side or regional reorganisation with compulsory formation of Joint Electricity Authorities, compulsory acquisition of all under-

²² Sir Ph. Dawson, *El. Rev.*, 98 (1926), p. 616.

²³ *El.*, 93 (1924), p. 223.

²⁴ *Ibid.*, p. 429.

²⁵ *Weir Report*, s. 43.

takings by these and retail distribution through municipalities.²⁶ The Minister of Transport stated that legislation was proposed which would bring generation into public hands.²⁷ Later it appeared that the Cabinet had abandoned the idea of nationalisation as hopeless of attainment and proposed instead legislation giving compulsory powers to the Commissioners to enforce frequency standardisation, speedy development, etc.²⁸ When in opposition the Labour Party pledged itself to full public ownership and control of generation, transmission and distribution and submitted an amendment to the 1926 Bill on these lines.

Although in 1924 the Labour Government did not attempt bold general legislation, conditions appeared favourable for taking certain preliminary steps towards the eventual unification and reform of the industry. Inter-connection was only practicable if the electricity produced in one plant could be easily transmitted to the network of another undertaker. Differences in the voltage of supply could be easily and relatively cheaply adjusted by means of transformers, direct current could be converted into alternating current, but differences in the frequency of alternating current supply, i.e. in their beat or pulse, presented insuperable obstacles. In most parts of the country a frequency of 50 cycles per second was in use, but important industrial areas varied from this, such as Birmingham (25 cycles), the North-East coast (40 cycles), Glasgow and South Wales (25 cycles). The power network of the Deptford station was supplied at 25 cycles and other plant produced at $33\frac{1}{3}$. If these areas were to be inter-connected with the other parts of the country, frequency standardisation was necessary, involving considerable expenditure on plant and equipment, as most electrical gear, from the generating plant down to the smallest motor, would have to be replaced or modified. An estimate made for the Weir Committee established a sum of £10,500,000 as the probable cost.

Britain's economic position at that time was unsatisfactory, her export markets were shrinking, home trade was slack and the financial and moral burden of unemployment depressing. Intense economic nationalism all over the world had created prohibitive tariff walls and policies of self-sufficiency, and even in Britain, the stronghold of *laissez faire*, public opinion lost faith in the self-

²⁶ *El.*, 93 (1924), pp. 134, 429.

²⁷ *Ibid.*, p. 240.

²⁸ Cf. Mr. Snowden, *Parl. Deb.*, H.C., 30-7-24, Vol. 176, c. 2106.

adjusting mechanism of free competition and became favourably disposed to State action designed to improve the situation. The insufficient electrification of the country was considered one of the causes of high costs which reduced its competitive power. Re-organisation in this sphere, therefore, promised both to cheapen power for industry and to provide immediate relief for unemployment.²⁹

A Committee on *Coal and Power*, presided over by Mr. Lloyd George, investigated these problems and stated: "With our various competitors going ahead swiftly in the direction of greater utilisation of power, a policy of preventing power development in industry would leave our workers in the position of having to compete on unequal terms so that the incompetence of management would have to be made up by the toil of the workers. It ushers in a vista of endless strikes, industrial trouble and internal strain. The way out is to be found in the direction of scientific production and utilisation of power."³⁰

The Trades Facilities Acts enabled grants to be given towards any scheme likely to employ labour and the Electricity Commissioners advised the Unemployment Grants Committee on suitable cases. The situation, however, called for large-scale developments beyond the scope of these Acts. As the Lloyd George Committee pointed out, owing to the limitations of the Commissioners' powers the unemployed labour forces available for constructive purposes could not be utilised, although it would have paid the State to expend large sums on the development of British power resources by the provision of State credits; but it was not too late to move in this direction; indeed, the times were more favourable owing to the fall of prices to a more or less stable level.³¹

The Labour Government of 1924 intended to act on these lines; as a first step Mr. Snowden suggested a policy of frequency standardisation, construction of main transmission lines and rural development financed by the government, as a national work of reconstruction, although carried out by the supply undertakers. He authorised the Commissioners to prepare schemes with the aid of consulting engineers and to confer with the Incorporated Municipal Electrical Association, the Incorporated Association of

²⁹ *Ibid.*, *El.*, 93 (1924), p. 429.

³⁰ *Coal and Power, Report of an Enquiry presided over by David Lloyd George (1924)*, p. 99.

³¹ *Ibid.*; pp. 107-8.

Electric Power Companies, and the Provincial Electric Supply Committee, on the formulation of main transmission schemes.³²

When in the autumn of 1924 Parliament was dissolved and a General Election announced, electricity supply was one of the main planks of the Labour Party, who proposed a comprehensive national system based on public ownership and control. The Conservatives did not commit themselves to a definite scheme, but Mr. Baldwin expressed himself against public ownership and considered that the true function of the Government was to encourage individual effort, to protect consumers and to secure co-operation wherever possible. He announced that he had formed a committee of practical men to advise him and awaited their report before taking any action himself.³³

The Conservatives won the election and, while the subject of electricity supply was not mentioned in the King's speech, Mr. Baldwin announced in the debate on the address, that the proposals submitted to the previous government were being carefully examined with a view to acting upon them if such action was for the benefit of the country.³⁴

This statement led to renewed interest in the Press and forecasts were made that the Cabinet had decided upon a broad policy of co-ordination and development.³⁵ The forecasts showed great similarity with Mr. Snowden's proposals; but the idea of nationalisation was shelved, as Mr. Baldwin was pledged to encourage private enterprise.³⁶ The *Morning Post* considered it unquestionably the duty of the government to scrutinise the progress of inter-connection; the inevitable territorial monopoly must be defined within limits which would not permit of exploitation of the consumer; responsibility could be accepted only by the State as, where there was monopoly, there must be public regulation. Far from savouring of Socialism, the government policy would be to regulate, stimulate and co-operate with private enterprise.³⁷

The *Times* expected the introduction of a Bill establishing a chain of companies providing electricity at a price allowing neither profit nor loss, an idea condemned in some quarters as "pure socialism,

³² *El. Com. 5th Annual Report (1924-5)*, p. 5.

³³ Speech at Queen's Hall, 15-10-24, reported *The Times*, 16-10-24.

³⁴ *Parl. Deb.*, H.C., 17-12-24, Vol. 179, c. 1061.

³⁵ Cf. *Dail Mail*, December 12th and 23rd, 1924.

³⁶ *El. Rev.*, 95 (1924), p. 841.

³⁷ *Morning Post*, December 22nd, 24th and 29th, 1924.

as no private enterprise could be expected to carry on business for the sole benefit of others.”³⁸

(2) *The New Solution: A National Transmission Board*

In all the speculations regarding the Government plans the central problem remained somewhat vague, namely how the contradiction could be overcome between the professed ideal of individual initiative and enterprise and the inescapable necessity, not only of State control, but of positive State action on a large scale. It was a little difficult to understand just where control ceased to be “control” and became “friendly co-operation.”³⁹ A solution had to be found which in some way combined effective central planning and executive control with the maintenance of the identity and the utilisation of the initiative and energy of the existing undertaker; it was eventually found in the creation of the Central Electricity Board with the function of purchasing all the electricity generated by the existing authorities and transmitting it to the distributing authorities.

Mr. Lloyd George's Committee took the first step in this direction. It proposed that the Electricity Commissioners should be given compulsory powers of acquisition, co-ordination and regulation, which they should use, if possible, to encourage and help electrical undertakers prepared to establish generating stations of suitable capacity and type. An effective means of giving such encouragement would be to offer the undertakers either a guaranteed rate of interest on their capital expenditure for a number of years, or to make an advance of State credit at low rates of interest, or finally to ensure for them a guaranteed market for a sufficiently large supply of electricity to make their undertaking commercially successful. To carry out the last-mentioned proposal, the Commissioners would be empowered to take a bulk supply of electricity from them and to distribute this to local undertakings and large consumers.⁴⁰ Generation and distribution would thus remain in the existing hands, but transmission would be increasingly concentrated in the Electricity Commissioners who, in their capacity as large-scale purchasers of current, would have considerable powers of control over the development of the industry.

³⁸ Quoted *El. Rev.*, 96 (1925), p. 1.

³⁹ *El. Rev.*, *loc. cit.*

⁴⁰ Coal and Power Report, *loc. cit.*, p. 115.

This proposal, with certain amplifications and alterations, formed the basis of the great legislative reform of 1926 which succeeded in achieving the necessary concentration without alienating the existing vested interests. In his speech during the second reading of the 1926 Bill, the Minister of Transport acknowledged that Mr. Lloyd George was the father of the measure and appealed for his support, as "imitation was the sincerest form of flattery."⁴¹

The "Coal and Power" Committee had suggested this important solution as one only of many alternatives and probably did not itself appreciate its usefulness. It was taken up again early in 1925 by Mr. C. B. Twiss who, in a series of articles⁴² on national electricity supply, elaborated the Lloyd George idea of a separation of generation and transmission. He introduced the new idea of a practically independent transmission board acting as a middle man between the producers of electricity and the distributors. He argued that electricity was the only public utility capable of economic transport on a scale comparable to that of ordinary industrial commodities, and that it could be made amenable to the laws of free competition. As in ordinary trade the functions of transport and distribution of commodities are separate from their manufacture, in the same way the wholesale transmission of electricity should be carried out by an independent undertaking owning and operating the transmission lines of the country. Twiss did not go so far as to recommend that competing private undertakings should engage in this business, as he feared that it would take a long time before the whole country was covered with a network of transmission lines. He proposed instead the creation of a National Electricity Board, constituted as a company but nominated and financed by the government. This Board would undertake the wholesale transmission of electricity and construct a back-bone of transmission lines throughout the country, to which all undertakings could be connected.

The transmission concern would purchase current from the most efficient stations and, after adding an amount to cover its operating expenses, should still be able to supply at prices lower than the generating costs of many local stations; the Electricity Commissioners should then have power to shut down the local plant and force the authority affected to take a bulk supply.

⁴¹ *Parl. Deb.*, H.C., 29-3-26, Vol. 193, c. 1704-5.

⁴² *El.*, 94 (1925), pp. 88, 116; *The Times*, Trade and Engineering Supp., 14-2-25.

At first sight the ingenuous proposal looked most attractive, but its practical implications did not appear very encouraging. The starting point for the recommendations of the Lloyd George Committee was the realisation that under the existing conditions an undertaker needed some guarantee of success as an inducement for constructing a large generating station. The creation of a Transmission Board, with the function of taking bulk supply, held out a hope that the new plant might be able to work to capacity, but only on condition that other undertakers did not themselves meanwhile engage in the construction of large and possibly cheaper stations. An uncontrolled wave of construction would open the vista of vast excess capacity, cut-throat competition and insufficient return on the capital invested, involving such a measure of insecurity and instability,⁴³ that it would harm rather than assist electricity development.

Under the depressed conditions of industry in the 1920s, undertakers would most probably not have been prepared to take such a risk,⁴⁴ and would only have embarked on large-scale construction with a satisfactory guarantee that their output would be required. The Transmission Board could only give such a guarantee, if it was more than a mere transporting agent and had the power and duty of controlling the construction of stations and generation as a whole, on the basis of careful estimates of the trend of demand and supply of electricity. For this purpose the whole of Britain had to be converted into a single unified super-power zone, a task which could only be carried out by State co-operation, since electrification on so large a scale was beyond the capacity of any municipality or power supply company.⁴⁵

This need was realised by the Committee appointed in 1925 by Mr. Baldwin "to review the national problems of the supply of electrical energy (Weir Committee)."⁴⁶ The Committee based its technical recommendations on reports put forward independently by three eminent experts, viz. Sir John Snell, Mr. C. H. Merz and Mr. J. M. Kennedy, remarkable for their similarity in technical details and financial estimates.⁴⁷ It devoted a great deal of attention

⁴³ Cf. *Weir Report*, *loc. cit.*, s. 41.

⁴⁴ *El.*, 94 (1925), p. 111.

⁴⁵ H. Quigley, *Electrical Power and National Progress* (1925), p. 102.

⁴⁶ M.O.T., *Stationery Office Publication* (1925).

⁴⁷ *Weir Report*, s. 27.

to the administrative question of how to effect the reorganisation necessary for achieving a general reduction in prices and making electrical energy available as widely as possible.⁴⁸

To ensure acceptance of their proposals, they respected as far as possible existing monopoly rights, although one of their members criticised these and considered it almost inconceivable that the country should have so far committed itself.⁴⁹

The Weir Committee submitted their report in May, 1925, but it was not published until much later, almost simultaneously with the 1926 Bill. Meanwhile, it was considered and approved by a Cabinet Committee,⁵⁰ but no further progress was made "for financial reasons,"⁵¹ although Mr. Baldwin was reported to have discussed it with Trade Union leaders from the angle of increasing employment.⁵²

The Weir Committee followed the Twiss recommendation and suggested a new transmission board, the Central Electricity Board (C.E.B.), charged with the duty of constructing as quickly as possible a system of high tension transmission lines and acting as a wholesale supplier of electricity to all authorised undertakings. The new board, however, was given the wider function of planning the development of electricity generation on the basis of a technical scheme for the whole country, and of controlling a restricted number of "selected stations" in which the generation was to be concentrated. The Weir Report formed the basis of the Electricity Supply Bill of 1926 and will be presently discussed in detail.

(3) *The Passage of the Bill*

In spite of considerable public interest in electricity reform, kept alive by newspaper articles, to which members of the B.E.A.M.A. (British Electrical and Allied Manufacturers' Association) made extensive contributions,⁵³ no further steps were taken by the Government until early in 1926, when Mr. Baldwin announced the Government scheme in broad outline.⁵⁴ He reiterated his conviction

⁴⁸ *Loc. cit.*, s. 2 and 4.

⁴⁹ Cf. Lord Forres (previously Sir A. Williamson), *Parl. Deb.*, H.L., 24-11-26, Vol. 65, c. 788.

⁵⁰ *El.*, 94 (1925), p. 679.

⁵¹ *El.*, 95 (1925), p. 144.

⁵² *El. Times*, 67 (1925), p. 587.

⁵³ Cf. *Daily Telegraph*, 22-26-6-25; *The Times*, 7-7-25, *Financial Times*, 19-10-25; *Manchester Guardian*, 29-10-25, *Yorkshire Post*, 12-1-26, etc.

⁵⁴ *The Times*, 16-1-26.

that it was not the business of the Government to manage and operate but to co-ordinate and control.⁵⁵

The Government Bill, published in March, 1926,⁵⁶ incorporated the main features of the Weir Report. Although its primary object was stated to be the reduction of the price of electricity to the final consumer,⁵⁷ there was little interference with the existing organisation of retail distribution, except for certain measures regarding price control.

The scheme was widely welcomed in political and industrial circles⁵⁸; it was even called a "bull point" for investors.⁵⁹ The B.E.A.M.A. and the F.B.I. (Federation of British Industries) whole-heartedly supported the measure "without which electrical progress might be fatally delayed."⁶⁰ Opposition by at least part of the supply industry had to be expected, as necessarily no measure of such far-reaching importance could be introduced without some injury to vested interests, but it was assumed that the Government would find no difficulty in rebutting criticism which was merely self-interested and destructive.⁶¹ Opposition grew, however, more vociferous than had been expected and the *Daily Mail* uttered a warning about "the plan engineered by interested members of the Conservative Party to wreck the Bill, the real opponents being a handful of members interested in the control of electricity supply undertakings."⁶² The *Observer* asked the Government to put its foot down on attempts to weaken the plan and reminded the Prime Minister of his promise to deal firmly with obstruction and vested interests.⁶³

The weight of opposition from the electrical industry became rather impressive,⁶⁴ but the reasons given betrayed a bewildering variety of views. There were still those individualists who thought State initiative and control in electrical development useless and unnecessary, and considered that the chief need was freedom from

⁵⁵ Cf. *Parl. Deb.*, H.C., 29-3-26, Vol. 193, c. 1705.

⁵⁶ *Electricity Supply Bill*, 1926, Bill No. 59.

⁵⁷ *Parl. Deb.*, *loc. cit.*, c. 1701.

⁵⁸ *The Times*, 18-1-26.

⁵⁹ *Financial Times*, 18-1-26.

⁶⁰ Cf. *Parl. Deb.*, H.C., 30-3-26, Vol. 193, c. 1892.

⁶¹ *The Times*, 19-1-26, *Leader*.

⁶² *Daily Mail*, 25-3-26, p. 10.

⁶³ *Observer*, 13-3-26.

⁶⁴ *Engineer*, 141 (1926), p. 101.

interference.⁶⁵ The power company engineers denied that the proposed legislation would improve the situation, claiming that it was the deletion of the compulsory clauses in the 1919 Bill which had enabled the industry to make such considerable headway during the last six years.⁶⁶

The Provincial Electric Supply Committee expressed the fear that the result of the proposed legislation would be a dearer supply of electricity. It claimed that cheap electricity could be better ensured by granting undertakers wider powers and relief from existing disabilities and restrictions. Concentration in too few hands would eliminate that competition of ideas on which progress depended.⁶⁷

Mr. Chattock, the City of Birmingham Electrical Engineer, believed that compulsion was unnecessary and that self-interest alone would lead to concentration of generation; he therefore opposed the principles of the Bill. He preferred a loose arrangement on the lines suggested by Twiss but on a regional rather than national basis in order to avoid the cost of frequency standardisation.⁶⁸ Against this, the *Electrician* affirmed that if there were any chance of the industry agreeing upon a scheme by itself it would have used the opportunity given during the last six years.⁶⁹

The critics so far mentioned, opposed the principle of the new legislation. Others objected to the methods and doubted whether the Bill would attain the object of cheap electricity to the consumer; they claimed that the proposals were cumbersome as well as costly and unworkable⁷⁰; the interposition of a third party was artificial and the idea of one transmission system futile⁷¹; salvation could not be brought about by "weird gridirons" or multiplication of authorities.⁷² The Institution of Electrical Engineers addressed a letter to the Prime Minister stating that certain provisions required material amendment and suggesting that the fundamental question upon which the Bill was based should be the subject matter of an

⁶⁵ *El. Rev.*, 97 (1925), p. 483.

⁶⁶ Letter in *The Times*, 15-11-26.

⁶⁷ *Financial Times*, 29-3-26, p. 10.

⁶⁸ *El.*, 96 (1926), p. 492; *El. Rev.*, 98 (1926), p. 719.

⁶⁹ *El.*, *loc. cit.*, pp. 111, 490.

⁷⁰ E.g. I.M.E.A. Resolution, 28-5-26, reported in *El. Rev.*, *loc. cit.*, p. 840.

⁷¹ *El. Rev.*, 96 (1925), p. 643.

⁷² *El. Rev.*, 98 (1926), p. 485.

enquiry at which the various interests in the electrical industry might be heard.⁷³

The Labour Party formally opposed the second reading of the Bill on the grounds that it would "create cumbrous machinery, strengthen and extend the hold of profit-making companies over an indispensable public service, continue the limitation of municipal undertakings in confined and uneconomical areas of distribution and offered to consumers in the company areas no adequate protection against excessive charges."⁷⁴ In spite of these general criticisms, the Party considered the Bill as a step in the right direction and assisted actively in the drafting of the Act.

At the second reading the Bill was attacked simultaneously by the Socialists as bolstering up private enterprise and by the Conservatives as a scheme for the socialisation of the industry. It was called "a bastard child of socialist and individualist parents with the faults of both."⁷⁵ The fear was expressed that power companies would refuse to work with the proposed Central Board and would want to sell their undertakings, which would lead to the nationalisation of the industry without Parliamentary control.⁷⁶ The Bill was only given its second reading by the dissentient Conservatives because the Labour Amendment calling for complete socialisation of the industry forced them into the Government lobby.

The opposition concentrated all its forces in the Committee stage, where a few members formed a "junta" to maintain the *status quo* "by bringing up some wrecking amendment over and over again."⁷⁷ Mr. Geo. Balfour, a director of a number of large power companies, again acted as the leader of the obstructionist party and earned the title of the "arch-ohm, the spirit of resistance to any progress in this direction."⁷⁸ In fact, Labour support was needed in several instances to avoid a Government defeat,⁷⁹ and Mr. Moore-Brabazon (now Lord Brabazon of Tara) paid a tribute to the Labour Party for never resorting to any Parliamentary trick in

⁷³ *El.*, 96 (1926), p. 397.

⁷⁴ W. Graham, *Parl. Deb.*, H.C., 29-3-26, Vol. 193, c. 1705-6; cf. Mr. Attlee, 12-11-26, Vol. 199, c. 1439.

⁷⁵ P. Harris, H.C., Vol. 193, c. 1722.

⁷⁶ D. Herbert, *loc. cit.*, c. 1718.

⁷⁷ *El.*, 97 (1926), p. 40.

⁷⁸ Mr. Moore-Brabazon, *Parl. Sec.*, M.O.T., *Parl. Deb.*, H.C., 12-11-26, Vol. 199, c. 1429.

⁷⁹ Cf. Standing Committee, 1926, c. 221-7.

order to defeat the measure, which they might very easily have done.⁸⁰

The Government made substantial concessions, e.g. it allowed the right of appeal to arbitration in most disputes, accepted the responsibility of the Board for the cost of frequency standardisation, and reduced the power of control of the Electricity Commissioners over the C.E.B. The changes went far to remove certain "objectionable" features of the original proposal, so far that they placed the Bill in danger of being seriously hampered by obstructionist tactics of an authorised undertaker.⁸¹ Mr. Attlee, however, admitted in the debate on the Third Reading that the Government had stood firm by the fundamentals of the Bill and had not made any dangerous concession.⁸² After certain minor changes had taken place in the remaining stages, the Bill was passed by the Commons in November and obtained Royal Assent on December, 15th 1926, as the *Electricity (Supply) Act, 1926*.⁸³

Why was the Bill, more revolutionary in many respects than previous attempts, passed in spite of the strong opposition from the ranks of the Conservative Party? There is evidence in support of the view that it would have failed, had it not reduced all interference with existing property rights to a minimum and also received a large measure of support from the Labour Party.⁸⁴ The pressing urgency of relief of unemployment and depression was another reason, combined with the fear expressed by the Attorney General that, if the Conservative Government was not allowed to set the house in order, the industry might be reorganised under a Labour regime which would have little respect for some of the vested interests, and would press forward the complete socialisation of electricity supply.⁸⁵

III. CENTRAL ELECTRICITY BOARD

(1) *Constitution*

The 1926 Act succeeded where legislation since 1900 had failed; it brought the statutory framework into line with the technical needs

⁸⁰ *Parl. Deb.*, H.C., *loc. cit.*, c. 1430.

⁸¹ *Econ.*, 103 (1926), p. 455.

⁸² *Parl. Deb.*, *loc. cit.*, ch. 1437.

⁸³ 16 and 17 Geo. V, ch. 51.

⁸⁴ Cf. T. O'Brien, *British Experiments in Public Ownership and Control* (1937), p. 39; G.H., *Socialisation of the Electric Supply Industry* (1934), p. 20.

⁸⁵ *Parl. Deb.*, *loc. cit.*, c. 1511.

of generation and main transmission. Its outstanding feature was the creation of the Central Electricity Board, which has become a prototype for reorganisation schemes designed to combine central State planning and administration on commercial lines. The resort to a public corporation represents a typical tendency of modern English legislation and has been investigated by a number of students of political economy.⁸⁶ Its application to electricity supply was not, however, the outcome of a consistent political theory, but rather the last of many attempts to provide the conditions necessary for modern large-scale production.

It is not surprising, therefore, that the solution adopted shows certain peculiarities, such as the somewhat vague and complicated relationship with the Electricity Commissioners. The new body is not a government department responsible to Parliament like the Post Office, nor a mixed authority of representatives accountable to the various constituent interested parties. It is a practically independent board of business men appointed by the appropriate Minister. Direct State operation with outright nationalisation of the industry and administration on civil service lines would never have been politically feasible. Even the Labour Party had no intention of developing a progressive and fluctuating industry like electricity supply on the basis of civil service routine.

The Joint Electricity Authorities introduced by the 1919 Act were designed as regional bodies, but the principle of representation of all the interests concerned could have been incorporated in a national scheme of co-ordination. No doubt this was originally in the mind of the Government, and when Mr. Baldwin gave the broad outlines of his proposals, he quoted the example of the successful authorities created for the Ports of London and Liverpool, as a guide to the policy he would adopt for electricity supply.⁸⁷

The Port of London Authority (P.L.A.) is actually a mixed authority consisting of 18 members elected by the Port users, viz. the traders and wharfingers, and 10 members appointed by the Admiralty, Minister of Transport, L.C.C., City of London, and Trinity House.⁸⁸

⁸⁶ Cf. L. Gordon, *The Public Corporation in Gt. Britain* (1938); T. O'Brien, *loc. cit.*; Marshall E. Dimock, *British Public Utilities and National Development* (1933); W. A. Robson, ed. *Public Enterprise* (1937).

⁸⁷ *The Times*, 16-1-26.

⁸⁸ Cf. L. Gordon, *loc. cit.*, chapter 2; also contribution by L. Gordon in W. A. Robson, *loc. cit.*, chapter 2.

The primary function of the elected member on a representative board is to safeguard the interests of the group or body on whose behalf he is on the board, and there is, consequently, a danger of friction and disagreement. In the case of the P.L.A., the various groups shared a prime and direct concern for the optimum use and the development of the port facilities, and this common interest was a guarantee of success of the Authority.⁸⁹ In other cases an active participation in the shaping of policy by the interested groups, even though they are conflicting, may be advantageous and necessary.

Electricity supply presented a different problem, inasmuch as a most important group of interests, those of the industrial and domestic consumers had no organised representation. It might be thought that all parties would have been united in a common interest in a cheap wholesale price of electricity, but as the function of the Board was to control and supervise independently-owned stations, the centrifugal forces would be strong, tending to leave a large and possibly excessive measure of autonomy with the individual undertakers.

It is also doubtful whether a Board supposed to be representative of 600-odd undertakers and possibly certain other interests would have been well equipped to undertake the essentially technical functions of generation and transmission : an expert body may hold out a better prospect of success.

An authority appointed by the Government and equipped with wide powers over the industry constituted a serious encroachment on the independence of the existing undertakers. Their opposition to the 1926 Bill is, therefore, not as surprising as their early acquiescence in the creation of the C.E.B., which, apart from the political considerations already mentioned, may be due to the following facts :—

1. The failure of the electricity undertakers to agree among themselves had seriously weakened their claim for consideration in the reform work, and responsible circles admitted the necessity for reorganisation from the outside.
2. The expectation that the Board would consist of eminent men of business and industry and be largely free from political interference, made it more acceptable in the eyes of companies

⁸⁹ Gordon, *loc. cit.*, p. 27.

and financial interests than unwieldy joint boards such as J.E.As., in which municipalities might have a majority of members.

3. The functions of the new Board were strictly circumscribed, all property rights and distribution powers remaining with the existing undertakers.

Despite the attempts in Parliament⁹⁰ and outside⁹¹ to substitute for the proposed board a body combining a nucleus of highly-paid and competent officials with representatives elected by the various interests concerned, the Government proposal found the acceptance of Parliament.

In accordance with the suggestions of the Weir Report,⁹² the Act constituted a board of eight members, all nominated by the Minister of Transport after consultation with bodies representative of local government, electricity, commerce, industry, transport, agriculture and labour. The first C.E.B. appointed after the passing of the Act, included two members with local government experience, two members from electric company undertakings, one from a railway company, one representative of industry, and one a Government nominee; one-half of the members had previously been engaged in electrical engineering.⁹³

Great precautions were taken to make the Board as independent as possible from outside influences; financially, by requiring full-time members to sell any securities of companies connected with electricity; politically, by fixing the period of appointment at from 5-10 years; and providing only one reason for cancelling the appointment, namely absence from office for more than 6 months.⁹⁴

Such security from political or other "outside" interference, assuming its desirability,⁹⁵ has the disadvantage that members who prove incompetent or unsuitable cannot be dismissed.

(2) *Relation to the Electricity Commissioners*

The creation of another public body in addition to the Commissioners was not envisaged in the original Lloyd George plan, according to which the Commissioners would have been granted

⁹⁰ *Parl. Deb.*, H.C., 9-11-26, Vol. 199, c. 977.

⁹¹ *El. Rev.*, 99 (1926), p. 742.

⁹² *Loc. cit.*, App. 4.

⁹³ T. O'Brien, *loc. cit.*, p. 55.

⁹⁴ *El. Supply Act*, 1926, s. 1.

⁹⁵ But cf. *infra*, p. 220.

all the powers necessary for transmission and wholesale distribution. On the other hand, the idea of divided control was familiar from the schemes providing for regional boards, supervised and co-ordinated by the Electricity Commissioners, and had the advantage of making the reform politically more palatable by preventing the emergence of a huge and all-powerful central authority.

The 1919 Act had restricted the powers of the Electricity Commissioners to two main functions: they were an expert body capable of planning technical schemes and advising on technical problems, but they had also, by taking over many governmental functions, established themselves as a quasi-judicial and administrative authority of high standing.

The work of introducing and carrying out the grid schemes called for business initiative, commercial and administrative experience, qualities completely different from the impartial aloofness associated with the Commissioners' previous tasks. Had they been granted the additional powers, a modification of their organisation and, probably, changes in their personnel would have become necessary. Difficulties might have arisen if, as the central re-organising body, they had threatened to encroach on the rights of existing undertakings, and had, at the same time, acted as judges in their own cause in their quasi-judicial capacity. By forming a new body, the danger of an overwhelming central power was reduced; operations of the C.E.B. would in certain respects be subject to the approval of the Commissioners, who would thus be responsible for ensuring that the Board did not exceed its statutory powers.⁹⁶

There was a case for dual control, if functions could be clearly divided, i.e. if the C.E.B. became the Government agent of unification and co-ordination, and the Commissioners the technical and judicial controlling body safeguarding the rights and interests of producers and consumers. Such a course was visualised in the original 1926 Bill, but the consequent subjection of the Board to the Commissioners' control was criticised. It was claimed that the Board could not function effectively unless it was given real executive power.⁹⁷ If subordinated to the Electricity Commissioners, it would have little justification for existence, and would be continuously handicapped in a cumbersome procedure, unable to press

⁹⁶ Haldane's contribution to Robson, *Public Enterprise* (1937), p. 141.

⁹⁷ Sir Ph. Dawson, *Rep. El. Rev.*, 98²(1926), p. 485.

forward with an effective and speedy development policy.⁹⁸

Owing to the pressure of criticism, certain concessions were made which, on the one hand, rendered the Board less dependent on the Commissioners, and on the other granted additional protection to the existing undertakings by allowing appeal to arbitration. The relation between the Electricity Commissioners and the C.E.B. became thus both complicated and confusing,⁹⁹ with ample scope for obstruction, if the two authorities happened to be hostile to each other.

(3) *Initiation of Schemes*

The overlapping of functions between the two central authorities is best illustrated by the uncertainty as to which should be responsible for the initiation of the technical schemes. The Government Bill laid it down that the C.E.B. should draw up the schemes and submit them to the Commissioners for approval, to whom undertakers might appeal in the event of a dispute.¹⁰⁰ In the committee stage the Government accepted an amendment according to which the Commissioners were to prepare the schemes and to submit their proposals for the approval of the executive authority, the Board. The originators of the scheme most likely to understand the technical aspects of the supply position were thus deprived of the power to ensure that the reorganisation would proceed on sound lines.¹⁰¹ On the other hand, to entrust the Commissioners with the planning was justified by their technical competence and preliminary spade-work done in determining electricity districts.¹⁰²

Obviously, either method involved some overlapping in the responsibilities of the two bodies, but of the two the amendment appears preferable: their technical experience enabled the Commissioners to propose the best possible scheme, whereas it was important for the Board to be able to make such modifications and concessions as would reduce the chance of friction with undertakers and ensure a maximum of co-operation.

In accordance with Sec. 4 of the 1926 Act the Commissioners had to prepare a scheme or schemes for the development of electricity.

⁹⁸ *Econ.*, 102 (1926), p. 554.

⁹⁹ Robson *ed.*, *loc. cit.*, p. 139.

¹⁰⁰ Bill, s. 5.

¹⁰¹ *Econ.*, 103 (1926) p. 455.

¹⁰² L. Gordon, *loc. cit.*, p. 114.

supply and transmission, covering the country as a whole, and not only individual areas. The new technical regime could only be brought into being by stages, commencing with certain large regions, but the Commissioners kept the broad plan of development for the whole of the country well in mind.¹⁰³ They divided Great Britain into nine regions (excluding the North of Scotland, which was not provided with a development scheme until the North of Scotland Hydro Electric Board was created in 1943). For each area the Commissioners prepared a scheme for adoption by the C.E.B., but it was later found advisable to join certain areas together into single regions with the result that today there are only seven grid areas. The schemes were adopted between 1927 and 1931, operations commenced in 1932 with the completion of the Central Scotland electricity scheme, followed by the completion of the South-East England, North-West England and North Wales scheme in 1934.

On the basis of estimates of future demands for electricity the Commissioners had to determine where and how many new stations would have to be erected, which generating stations were efficient enough to serve as main supply stations to the C.E.B. and thus could become "selected stations." They had further to establish the position of the main transmission lines which would form the backbone of inter-connection, and were to cover the whole country like a "gridiron."¹⁰⁴

The C.E.B., after receiving the scheme, would, by public notice, give interested parties an opportunity to make representations. These could propose alterations and, if their suggestions were not accepted, could appeal to arbitration by a barrister, who could, however, not enforce any fundamental changes in the scheme. Nevertheless, the power of opposition and obstruction given to selected station owners was considerable and the warning was raised that the business of co-ordinating electricity supply would wholly depend on the power of the Board to preserve and maintain the goodwill of the undertakers, failing which a barrister, assisted by one or more assessors, would virtually take over their duties.¹⁰⁵

In order to avoid unnecessary friction, the Chief Engineer and Secretary of the C.E.B. visited the undertakings within an area for

¹⁰³ *El. Com. 7th Annual Report* (1926-7), p. 37.

¹⁰⁴ Hence the popular term "grid."

¹⁰⁵ *Econ.*, 103 (1926), p. 455.

technical discussion and consultation, and were thus enabled to obtain a clear picture of the local position before publishing their scheme. Resort to formal enquiry or arbitration never became necessary.¹⁰⁶

Subject to this right of appeal to arbitration, the Board had authority to direct the owners of selected stations to operate and carry out any extension or alteration they considered necessary. If the arrangements were not carried out satisfactorily, the Minister could empower any authorised undertaker or person, but only in the last resort the C.E.B. itself, to acquire the generating stations.¹⁰⁷ The Board was not allowed to operate them unless it was unable to make suitable arrangements with other bodies. Similar restrictions on what might be the danger of "cold nationalisation" also applied in the case of the erection of new stations.¹⁰⁸ The fullest possible safeguard was given to existing interests against any nationalising tendencies of the Board.

After the adoption of a scheme, the C.E.B. was to take over, and, where necessary, construct the main transmission lines required for the inter-connection of the selected stations.¹⁰⁹

As previously stated, standardisation of frequency formed an essential part of the scheme of reorganisation, and the Board was granted power to require any authorised undertaker or owner of selected stations to alter the frequency of his plant against payment of all the expenses incurred.¹¹⁰ The necessary capital could be advanced free of interest by the Board, who, in turn, could debit the annual interest and sinking fund charges to the Electricity Commissioners. As all authorised undertakers in the country are responsible for the expenses of the Commissioners,¹¹¹ the cost of frequency standardisation is, therefore, borne by the electric supply industry as a whole. The conversion to standard frequency affected mainly the regions of West Scotland, North-East and Central England, and necessitated an expenditure of £19 million.

(4) *Working of the Schemes*

The planning and initiation of an integrated supply system was

¹⁰⁶ C.E.B., *First Annual Report* (1927-8), p. 5.

¹⁰⁷ *Electric Supply Act*, 1926, s. 5.

¹⁰⁸ *Ibid.*, s. 6.

¹⁰⁹ *Ibid.*, s. 8.

¹¹⁰ *Ibid.*, s. 9.

¹¹¹ Cf. *Electric Supply Act*, 1919, s. 29.

the first stage in the reorganisation of the supply industry ; it was only the foundation upon which the centralisation of generation and the unification of control could be built.

(a) *The C.E.B. a Wholesaler of Electricity*

The Central Board, in its capacity as national transmission board, purchases all electricity generated in selected stations at cost price.¹¹² In ascertaining the cost of production, a proportion of all expenses of an undertaking, as far as they are attributable to the generating side, and allowances for depreciation are taken into account.¹¹³

The position of the Board is, however, considerably stronger than that of an ordinary wholesaler dependent on the offers of independent suppliers ; for, although the generating stations remain the property of the undertakers, the C.E.B. controls in a very real sense their operation¹¹⁴ ; it decides the location of new stations and the extension of existing ones, although advised by district consultative committees. Even the design of plant is controlled by the Board, but the larger undertakings have a more or less free hand in the details of the construction. The Board plans the operation programme and, whilst it is stated that the day-to-day execution is jointly in the hands of the Board and the local undertaking,¹¹⁵ the manner and times at which the owner can use his plant are entirely outside his control.¹¹⁶ Instructions are issued from the regional control centre, which, in turn, receives orders from a central control room.

One hundred and forty-one selected and forty non-selected stations are under the direction of the Board, which controls a transmission system of 5,142 miles of lines, 70 per cent. of which are at 132 kV (C.E.B. Report, 1944).

The economies derived from this central control consisted in the release for active production of a large part of the country's reserve plant and especially in the reduction in running costs arising from the concentration of generation in the more efficient and larger stations and the consequent restriction of the use of less economical plant to short peak demands.¹¹⁷ The Board became the main source

¹¹² *Electric Supply Act*, 1926, s. 7.

¹¹³ *Ibid.*, 2nd Schedule.

¹¹⁴ Robson ed., *loc. cit.*, p. 124.

¹¹⁵ J. F. Field, *El. Rev.*, 134, (1944) p. 699 f.

¹¹⁶ J. A. Summer, *ibid.*, p. 639.

¹¹⁷ C.F.B., *5th Annual Report* (1932), p. 29.

of electricity supply in bulk and had the obligation to give a supply on request, either directly or indirectly, to any authorised undertaker.¹¹⁸ Existing bulk supply authorities are, however, protected from any competition by the Board.

In 1938 only 30 out of 137 selected stations were run throughout the year and 13 stations supplied 50 per cent. of the total amount of electricity generated. Spare plant which, in 1921-2, had been 68 per cent. of the maximum demand, rose to 84 per cent. in 1929-30, to fall to a mere 16 per cent. in 1938-9. The saving in annual costs through the pooling of spare plant alone was stated by Mr. E. R. Wilkinson, the commercial manager of the C.E.B., to be sufficient to repay the annual grid charges, so that other economies and advantages were peace-time benefits.¹¹⁹

The Central Board is a non-profit making public corporation supplying electricity at rates fixed so that over a period of 10 years the receipts on income account shall be sufficient to cover the expenditure on income account, including interest and sinking-fund charges.¹²⁰ Obviously, the Board could not pay the heavy initial capital expenses out of revenue, and required borrowing powers. Owing to the pressure of opposition these powers were, however, surrounded with many safeguards: the Board needs the consent of the Electricity Commissioners and is subject to regulations made by the Ministry of Fuel and Power with the approval of the Treasury and may apply capital only for certain stated purposes. The sum authorised was originally limited to £33½ millions, but has since been increased to £60 millions. Payment of interest and sinking funds could be suspended for the first five years.¹²¹

The Treasury is empowered to guarantee loans raised by the Board both as to interest and principal, but the Board, preferring to retain its financial independence, has never applied for this guarantee in respect of any of its stocks.

(b) Bulk Supply Charges of the C.E.B.

The Central Electricity Board, by purchasing an overwhelming proportion of the electricity generated in Great Britain, has a virtual monopoly of wholesale supply. Even the owners of selected stations

¹¹⁸ *Electricity Supply Act*, 1926, s. 10.

¹¹⁹ Reported *El. Rev.*, 135 (1944), p. 587.

¹²⁰ *Electricity Supply Act*, 1926, s. 11.

¹²¹ *Ibid.*, s. 27.

cannot retain any part of their output, but have to repurchase from the Board to meet their own requirements.

The tariff which it was expected would be applied for the vast majority of undertakings is the grid tariff which, in accordance with Sec. 11 of the 1926 Act, consists of a fixed kW component and a running charge. The fixed part is a maximum demand charge and is determined by the highest half-hour demand from the authorised undertaking during the four winter months. As the fixed component constitutes a considerable part of the tariff, an undertaker can substantially reduce his costs by improving his load factor. The kilowatt tariff is further graduated, providing for a certain kW charge in respect of a defined "basic demand" and reduced charges for specified increments in demand. By this means the framers of the tariff tried to encourage an active development policy. The actual rates of tariff vary in different regions.

The grid tariff is not the only tariff at which the C.E.B. supplies electricity to authorised undertakers. Both selected station owners and certain non-selected station owners can obtain supplies at more favourable rates. The position of the latter will be examined in the following section; at present attention will be focused on the selected stations.

The owners of selected stations have the option to purchase electricity on a different basis from the grid tariff, if this appears to them more advantageous :—

1. For all their own requirements, but not exceeding the amount generated at their station, at "adjusted station cost," i.e. at the cost of production at which the station supplies electricity to the Board, adjusted according to the load factor and power factor of the supply taken, together with a proper proportion of the Board's general expenses.¹²²
2. Where a selected station owner can prove to the Electricity Commissioners that the cost of taking supply from the Board on any of the two tariffs mentioned, exceeds the cost at which the undertaker could have generated independently in the absence of the 1926 legislation, the charges by the Board have to be so adjusted that the amount paid in any given year does not exceed that cost¹²³ (hypothetical cost charge).

¹²² *Ibid.*, s. 7.

¹²³ *Ibid.*, s. 13.

The purpose of the legislation, in granting these alternatives to the ordinary grid tariff, was not only to protect the selected station owners from loss, but even more to give them an incentive to maximum efficiency by making them the chief beneficiaries from any cheapening of production. It has been questioned whether, in view of the direct and detailed control by the C.E.B., such stimulus is still necessary and effective,¹²⁴ especially if it means that the country as a whole is penalised by the ability of certain stations to purchase electricity below its average cost to the C.E.B., thus throwing an undue proportion of the Board's overhead charges on the remaining undertakers. Experience has shown that the operation of the Act resulted in a distribution of advantages by no means in proportion to the services rendered by the selected stations.¹²⁵

The hypothetical cost system is based on conjectures "of what might have happened if something else had not happened,"¹²⁶ and includes capital charges on hypothetical new and spare plant, although no such plant may exist. It must become ever more "false, fanciful and fantastic,"¹²⁷ and it is to be regretted that a provision was eliminated from the Bill during the committee stage which would have restricted the application of this alternative method of charge to a period of seven years.

As the adjusted station cost basis of charge includes a proportion of the Board's expenses, it is only of advantage in the case of small undertakers which have erected large stations for grid purposes and want to reap the benefit of large-scale production unattainable under independent operation.¹²⁸ In most cases, therefore, the hypothetical cost basis is preferred by selected station owners.

The C.E.B. departed considerably from the recommendation of the Weir Committee (which had proposed to limit the number of selected stations to 43 out of a total of 438) and found it advisable to select as many as 141 stations; the grid tariff consequently applies only to a minor portion of the energy sold by the Board; it amounted to 12.5 per cent. in 1941.¹²⁹ The majority of undertakers pay prices which cannot be accurately estimated in advance

¹²⁴ Cf. L. Gordon, *The Public Corporation in Great Britain*, p. 151.

¹²⁵ C.E.B., *7th Annual Report* (1934), p. 11.

¹²⁶ Bolton, *El. Rev.*, 129 (1941), p. 22.

¹²⁷ J. L. Carr, *El. Rev.*, 130 (1942), p. 107.

¹²⁸ N. Elliott, *El. Rev.*, 129 (1941), p. 543.

¹²⁹ Cf. N. Elliott, *loc. cit.*

and render the planning of the grid tariff exceedingly difficult.¹³⁰

The wholesale price of electricity is consequently by no means uniform, but fluctuates within fairly wide limits. Controversy rages on the question whether selected station owners derive an undue advantage from the option of special tariffs, a problem which cannot be examined here in detail. If, however, for reasons to be discussed at a later stage, an equalisation of charges to final consumers is considered desirable, then it appears that the privileges of selected station owners will have to be abolished. It has been pointed out that the sacrifice they would be expected to make is of a relatively small order; the price paid by them is on the average one-sixth below the grid tariff and, considering the small proportion of the grid supply sold at the ordinary tariff, the increase would be in the nature of only 2 per cent. to 4 per cent.¹³¹

The repeal of Sections 7, 12, 13 and 14 of the 1926 Act and the formulation of a national bulk supply tariff, as urged by the I.M.E.A. and many engineers, would not, therefore, constitute a real hardship.

(c) *The Position of Non-selected Stations*

The 1926 Act intended that eventually only selected stations should remain in existence, but it did not provide for an automatic closing down of other stations; on the contrary, it safeguarded the existence of independent plant as long as it was economically justifiable. It was, however, laid down that if required by an undertaking to give a supply the C.E.B. could insist on supplying its total needs, thus obviating a policy of continuing to generate basic requirements in a small local station and only covering peak demands from the grid. The Board can, however, only act in this way if it is satisfied that it can supply electricity over a period of seven years at a lower price than the cost, excluding capital charges, of independent generation in the local station.¹³²

In addition, the Electricity Commissioners have compulsory power to close down inefficient generating stations, if the undertaker is not prepared to make some agreement with the Central Board.¹³³ In the original Bill a rather complicated procedure had been sug-

¹³⁰ De Chazeau, *Rationalisation in Electricity Supply*, *Journal of Land and Public Utility Economics* (1934), pp. 369 ff.

¹³¹ J. A. Sumner, *El. Rev.*, 134 (1944), p. 639.

¹³² *Electric Supply Act*, 1926, *loc. cit.*, s. 10.

¹³³ *Ibid.*, s. 14.

gested, according to which a small station was prevented from charging any more to its consumers than if it had taken current from the Board, but in committee it was agreed that the positive power to shut down a station would be more effective.¹³⁴

Even so, there are a number of safeguards against quick and too rigorous action on the part of the Central Board. First, the Board must notify the undertaker that it is in a position to supply for a period of seven years at a tariff below the station cost ; if the undertaker does not agree within three months to take a grid supply, and if the Commissioners are satisfied in respect of the next year that the cost of electricity generated at the local station exceeds substantially the cost of bulk supply from the Board, if further, the Commissioners consider it expedient that the station should cease to be used as a generating station, only then can the Electricity Commissioners, by order, require the authorised undertaker to shut down his plant. The undertaker has, further, the right of appeal to arbitration.¹³⁵

The compulsory closing down of plant was made more difficult by the provision that on the one side the total costs of grid generation were to be included, but in calculating the cost of production of the local plant, no account should be taken of its capital charges. Only the prime costs were to be included, as the capital charges would have to be borne by the undertaking in any case. This condition has been criticised on the grounds that it would only have been reasonable before the grid was constructed. "After construction the capital charges on both the grid and the undertaker's plant are inevitable in any event, and, therefore, it would be in the national interest for the supply to be given from the grid if the operating cost of the grid is less than that of the undertaker."¹³⁶ This objection is only justified provided and as long as there is unused capacity in the stations supplying the grid so that the change-over from independent to bulk supply does not directly or indirectly necessitate further capital expenditure on generating plant. Except in the early stages it is, therefore, not permissible to take the capital costs of the national supply network for granted and not to

¹³⁴ Cf. Moore-Brabazon, *Parl. Deb.*, H.C., Vol. 199, c. 1434.

¹³⁵ 1926 *Act*, s. 14.

¹³⁶ G. H., *Socialisation of Electric Supply Industry* (1934), p. 25 ; cf. L. Gordon, *loc. cit.*, p. 108.

include them in cost comparisons, unless marginal cost generally is made the basis for price fixing.

It may, however, be that the supersession of a local plant is in the national interest and essential for the progress of electricity in undeveloped areas, although on the comparison of costs as specified in the Act independent generation would be cheaper. Undoubtedly it would be unfair and against the principle of the legislation to force the local undertaker to pay a higher price and he must be relieved either of the capital charges on his own plant or of those of the grid. The first solution, previously suggested for London¹³⁷ would render the country liable for any imprudent and wasteful construction policy on the part of local undertakers (but are the local inhabitants any more responsible for past mistakes ?) ; on the other hand, it would bury the past and place as many supply authorities as possible on the basis of an equal grid tariff.

The other solution is for the Board to supply electricity at a lower figure than the general grid tariff, if only the cost of supplying the additional load, i.e. its marginal cost, is covered. A general reduction in the grid tariff to the level of marginal cost was out of the question, although it may deserve serious consideration for the future, but the C.E.B. took the step of departing from the uniformity of charges by entering into special arrangements with certain undertakers.

Apparently the Board adopted sometimes both methods at the same time by agreeing to pay the capital charges of the local station concerned and giving a bulk supply of electricity at a price slightly lower than would have been the case with independent generation, including existing and hypothetical future capital costs.¹³⁸ This may amount, if capital charges and running costs are low, to subsidising a non-selected station owner to the detriment of the other authorities who have to carry the burden of grid charges.

Whether such a policy is in the national interest or not, it was not authorised by the 1926 Act, and had to be legalised in a new Act in 1935.¹³⁹ This Act permits such arrangements, even retrospectively, subject to the consent of the Electricity Commissioners, who have to be satisfied that the Board is not making a financial loss and that no other authorised undertaker will be substantially prejudiced thereby.¹⁴⁰

¹³⁷ Cf. *supra*, p. 161.

¹³⁸ *Econ.*, 135 (1939), p. 311.

¹³⁹ *Electricity Supply Act*, 1935, 25 Geo. V. Ch. 3.

¹⁴⁰ *Law. cit.*, s. 1.

The Commissioners were given the duty of inquiring into the working of these arrangements and had the power of prohibiting the continuation of those which did not comply with the conditions of the Act.¹⁴¹ According to the C.E.B. Reports, the majority of non-selected stations could not be forced to take grid supply under the 1926 Act, and as many still had some economic life, arrangements were made to use them for standby purposes against a rental,¹⁴² another factor which kept the number of retained generating stations higher than originally estimated.

An example of such special arrangements is the agreement by which the London and Home Counties Joint Electricity Authority controls certain non-selected stations at the direction of the Central Board and thus extends the sphere of central control. The undertakings concerned benefit by being able to purchase electricity at special contract rates below the grid tariff.

(d) Position of Power Companies and J.E.As.

The Central Electricity Board was intended to carry out on a national scale what the power companies had been authorised to do for industrial districts, namely to supply electricity in bulk to distributing authorities. Were, therefore, power companies to lose this important part of their business? The Weir Report did not propose to alter the companies' right to supply, as long as the benefits of cheap generation were passed on to the distributing undertakings.¹⁴³ The Act similarly laid down that the Board shall not supply electricity directly to authorised undertakers in Power Company areas without the power company's consent, unless the undertaker has an absolute veto on the bulk supply rights of the company or unless the Power Company is unwilling to supply on reasonable terms or conditions.¹⁴⁴ An undertaking giving bulk supply must charge the same terms at which it obtains electricity from the Board, with appropriate additions for the use of the transmission lines, management costs, etc., unless different prices had been fixed by contracts entered into before the passing of the 1926 Act.¹⁴⁵

Another important question arises, namely whether and to what

¹⁴¹ *Loc. cit.*, s. 2.

¹⁴² C.E.B., *8th Annual Report* (1935), p. 13.

¹⁴³ *Weir Report, loc. cit.*, s. 58-61.

¹⁴⁴ *Electric Supply Act*, 1926, s. 10.

¹⁴⁵ *Ibid.*, s. 12.

extent the reorganisation visualised by the 1919 Act retained any purpose and meaning within the framework of national generation. One of the main functions allotted to the J.E.As. had been the co-ordination of generation and transmission, but, as the Weir committee pointed out, the creation of the grid system removed many of the difficulties which it had been hoped to eliminate by the constitution of J.E.As.¹⁴⁶ Whilst they saw no objection to the survival of existing, and even the creation of new J.E.As., they did not recommend any extension of compulsory powers in this direction.¹⁴⁷

The passing of the 1926 Act ensured development on national lines, but the appeal of the idea of regional self-government was strong enough to cause certain clauses to be inserted for the benefit of Joint Authorities. If the Central Board takes over a selected station within a J.E.A. area, the Board shall first endeavour to enter into arrangements with that Authority to operate the station.¹⁴⁸ Strangely enough J.E.As. are not given a first option of operation where new selected stations are provided by the Board.¹⁴⁹ Furthermore, certain functions can be delegated by the Board to a J.E.A. or other undertakings, but such a delegation is only mandatory, if an association of selected station owners demands it and can satisfy the Board that such an arrangement would not prejudice the efficiency of the scheme.¹⁵⁰

The functions of the C.E.B. supersede to a large extent the functions of J.E.As. and other district authorities on the generating and transmission side.

The Electricity Commissioners, therefore, proposed that, as the main consideration was no longer the interest of the supply in the particular district, but the wider requirements of a national scheme, it would be an unnecessary expenditure of time and effort if applications to the Electricity Commissioners for consent to the construction of generating stations had to be approved by the District Authorities; they should only receive notice, but should refrain from expending time on the consideration of such applications from a district point of view. Most District Authorities, at a Conference

¹⁴⁶ *Weir Report, loc. cit.*, s. 71.

¹⁴⁷ *Ibid.*, s. 73.

¹⁴⁸ 1926 *Act*, s. 5 (3).

¹⁴⁹ *Ibid.*, s. 6 (3).

¹⁵⁰ *Ibid.*, s. 2.

in January, 1929, adopted a resolution that the purpose of the proposals could be achieved, if the C.E.B. and intending applicants obtained their views before an application was made to the Commissioners.¹⁵¹

Regional bodies still have a potential function in the re-organisation of distribution, especially where large company undertakings would otherwise be split up amongst a number of local authorities.¹⁵² It may be for this reason that the Act amended the previous legislation and introduced simpler and stronger machinery for the establishment of Joint Authorities; after deciding that such an Authority should be formed, the Electricity Commissioners have to give notice, and after consultation with authorised undertakers in the area shall formulate a scheme. A local enquiry shall be held at which interested parties must be given an opportunity of making representations, but are unable to prevent the formation of the Authority.¹⁵³

This constitutes in effect a partial return to the principle of the 1919 Bill that the regional body is to be planned as an organic part of a national scheme and might remove the delay and lack of coherence of locally devised schemes. Wider powers were granted to the J.E.As., namely that of carrying out, with the Commissioners' approval, any works for the development of electricity supply within their district.¹⁵⁴ This somewhat vague clause was attacked in committee as enabling Joint Authorities to counteract the national policy of the Central Board,¹⁵⁵ but was eventually accepted, as the Electricity Commissioners' power of control was an adequate safeguard.

In spite of the encouragement given to Joint Electricity Authorities, the progress after the passing of the Act was very slight, only one new J.E.A. was formed in the North-West Midlands Area.¹⁵⁶ As Joint Authorities could not be made the instrument of an immediate reorganisation of distribution without further legislation, their usefulness was limited. Later proposals actually discouraged the use of representative boards.

¹⁵¹ *El. Com. 9th Annual Report*, p. 33 f.

¹⁵² Cf. W. S. Kennedy, *The New Electricity Act*, 1927, p. 65.

¹⁵³ *1926 Act*, s. 36.

¹⁵⁴ *Ibid.*, s. 37.

¹⁵⁵ Standing Committee C. (1926), c. 1184 ff.

¹⁵⁶ *El. Com. 9th Annual Report*, p. 43.

(5) *Control over the C.E.B.*

The characteristic feature of a public corporation such as the C.E.B. is the wide power vested by statute in a practically independent body. The absence of detailed and continuous control by Parliament or a responsible Minister distinguishes it from direct government enterprise and makes possible an administration on commercial lines. Freedom from the limitations of civil service routine is, however, in itself no guarantee of efficiency, nor will a public board always follow the best advisors and never pursue a wrong policy. Power unchecked by democratic control becomes arbitrary; such control is necessary for the protection of the particular interests affected and possibly injured by the actions of the Board, and as a safeguard of the community as a whole. The 1926 Act provided for suitable checks and controls over the C.E.B.

(a) *Control by the Electricity Commissioners*

It has already been stated that supervision of the Board's activities on many specific issues was entrusted to the Electricity Commissioners acting on behalf of the Minister. Here is a short list of the principal cases in which the Commissioners may be called upon to intervene: disagreement regarding the price for the acquisition of generating stations and transmission lines; disputes relating to the obligations and rights of owners of selected stations (except those regarding the cost of production, which are referred to an arbitrator); problems of frequency alterations and disputes concerning the closing of generation stations.¹⁵⁷ The Commissioners had also detailed technical control over the activities of the Central Board and retained, even after the completion of the grid, the task of preparing formal schemes for extensions which have to be approved by the Board. A simplification of this procedure, allowing the C.E.B. to plan its own extensions in the same way as other undertakers and leaving the Commissioners the task of formal approval, seems advisable.¹⁵⁸

The relation between the Commissioners and the Central Board forms a unique example of control over a public corporation combining non-political supervision with ultimate responsibility to Parliament. It may be questioned whether it is the most effective means of safeguarding the public interest against inefficiency,

¹⁵⁷ Cf. Dimock, *loc. cit.*, p. 220.

¹⁵⁸ J. R. Beard, *J.I.E.E.*, 98 (1941), p. 26.

slowness, lack of appreciation of public needs and undue fear of experimental change. On the one hand, a reactionary Electricity Commission may successfully obstruct a progressive Central Board. On the other hand, the fear was expressed that as the C.E.B. was the child of the Commissioners, both would be imbued with the same faith in the superiority of central control and administration. Could the Commissioners under these circumstances, be expected to be impartial judges on appeals against alleged encroachments of local rights by the Board?¹⁵⁹ The existence of two central authorities left open the possibility of harmonious co-operation or antagonistic friction.

Gordon reached the conclusion that "where any public enterprise is set in a maze of unrelated private and local interests, various technical functions in filling necessary and desirable gaps in legislation would remain for a further impartial authority. The combination of technical and administrative qualifications in the present members of the Electricity Commission seemed ideally fitted to this task."¹⁶⁰ In actual fact, the Commissioners have not shown themselves biased in the Board's favour and have discharged their functions with fairness and good judgment, so that they were appealed to in case of disputes in preference to the judicial tribunals authorised by the Act. There has been a high degree of co-operation with the C.E.B., which has so far avoided difficulties and friction.¹⁶¹

With the completion of the technical schemes the function of the Electricity Commissioners has tended to become mainly supervisory and judicial, and, on the other hand, the C.E.B. has developed into a large bulk supply undertaking. The solution appears workable, but time and again suggestions have been made for the creation of one controlling authority directly responsible to the Minister, and through him to Parliament,¹⁶² that the Commissioners should be amalgamated with the C.E.B., which would result in a considerable clarification of the position and facilitate a proper planning of the industry.¹⁶³ As long as the present system, retaining a large degree of private independence, is maintained, there appears, however, to be no overwhelming case for reform in the central bodies. Even in

¹⁵⁹ Dimock, *loc. cit.*, p. 221.

¹⁶⁰ L. Gordon, *loc. cit.*, p. 118.

¹⁶¹ *Ibid.*, p. 117; Haldane, *loc. cit.*, p. 120.

¹⁶² *El. Rev.*, 98 (1926), p. 485.

¹⁶³ Haldane in Robson ed, *loc. cit.*, p. 141; cf. Lord Reith, *Parl. Deb.*, H.L., 17-6-42, Vol. 123, c. 423.

the event of complete nationalisation of the electricity supply industry, a supreme judicial body supervising the executive authority may prove advantageous.

(b) *Arbitration*

The Weir Committee had been satisfied that the Electricity Commissioners would be a suitable and sufficient controlling body ; the original Government Bill allowed in addition an appeal to the Railway and Canal Commission.¹⁶⁴ Complaints were raised against the growing tendency of Government Departments to seek to place themselves above the law and to debar the private citizen from appealing to the Law Courts, if aggrieved,¹⁶⁵ but undoubtedly ordinary legal procedure is ill suited to the settlement of technical disputes. In committee, when the power of the Commissioners was weakened, a clause was introduced giving the various undertakers the right to refer practically any matter to arbitration by a barrister appointed by the Minister.¹⁶⁶ In vain had Mr. Lloyd George warned against too many safeguards : " The danger is you may have so many safety valves that your steam may be out before it reaches the machine."¹⁶⁷

Appeal to arbitration was expressly authorised against any obligation imposed upon an undertaking in pursuance of the scheme, with the proviso that only pecuniary compensation should be granted where the Board certifies that any other relief would conflict with the basic principle of the scheme or would prejudicially affect its efficiency¹⁶⁸ ; in the absence of agreement, arbitration was to determine the costs payable to undertakings for alteration of switchboards,¹⁶⁹ or other expenses incurred in connection with standardisation of frequency.¹⁷⁰ Finally, the right of the Board to demand that a non-selected station should take all its supply from the grid could be thus challenged.¹⁷¹

The possibility of appeal to arbitration constituted a considerable concession to local interests and armed the undertakers with an

¹⁶⁴ *Electricity Supply Bill*, 1926, s. 5.

¹⁶⁵ Mr. Hume, *Parl. Deb.*, H.C., Vol. 193, c. 1773.

¹⁶⁶ *Electricity Supply Act*, 1926, s. 4 (3).

¹⁶⁷ *Parl. Deb.*, *loc. cit.*, c. 1906.

¹⁶⁸ *Electricity Supply Act*, 1926, s. 4 and 5.

¹⁶⁹ *Ibid.*, s. 8 (3).

¹⁷⁰ *Ibid.*, s. 9 (4).

¹⁷¹ S. 10 (3) ; 14 (2).

important bargaining counter, as the Board is likely to grant concessions to avoid such an appeal with all the delays and legal expenses it entailed. It forced the C.E.B. to adopt very largely a policy of conciliation and compromise. Actually it has never exercised its compulsory powers and has sometimes agreed to retain a generating station entirely for non-economic reasons, if it could thereby maintain the goodwill of electricity authorities.¹⁷³

(c) Parliamentary Control

Arbitration constitutes a safeguard of the owners' interests against excessive interference or financial injury by the Central Board, but is it suitable as a protection for the consumers and the public as a whole? What powers are there to overcome an inefficient or unenterprising policy pursued by the Commissioners, the C.E.B. or both bodies jointly?

It has already been shown that members of the Board, otherwise qualified, cannot be dismissed except for failing to attend meetings without adequate reason for a period of six months. The chance of introducing "fresh blood" is entirely determined by the term of office fixed for the members. The desirability of such independence has been questioned. The need for consultation with interested parties before the appointment of new members constitutes a useful safeguard, but is not deemed sufficient by critics of the present position.

It is in the power of the Minister to control to a limited extent the C.E.B. through the Board's obligation to submit an annual report of its proceedings to him, and indirectly through the Commissioners. In this body the majority of the members hold office "during His Majesty's pleasure," and can be replaced by members whose administration harmonises closely with the policy of the Government. This difference in the status of the two central controlling bodies is perhaps surprising, but is to be explained by the fact that the Commissioners are much more intimately connected with the Government than the Board. As the chief planning and controlling body and chief judicial authority on electrical matters they act more directly on behalf of the Government.

This close control over the Electricity Commissioners enables the Minister to exercise indirect pressure over the C.E.B., but

¹⁷³ L. Gordon, *loc. cit.*, p. 109.

apart from major questions of policy the central government interferes only to a very small extent with the working of the Board : the functions of the Minister are limited to the issue of regulations regarding the Board's borrowing powers,¹⁷³ the control over way-leave powers¹⁷⁴ and the publication of reports.¹⁷⁵

As the Board has complete autonomy in regard to its sources of revenue, no discussion in Parliament is possible on the Ministry's annual vote.¹⁷⁶ Opportunities for discussion exist on private members' motions and at the adjournment, but in the past question time has been the favourite method of raising particular points. In summing up the position, O'Brien noted little disposition on the part of Parliament to criticise or control the Board, due probably to the limited degree of political interest in its operation, the complexity and technical character of most of the Board's functions, the appeal to national interest and prestige in the work of constructing the grid, and, further, to the success with which this initial function was carried out by the Board.¹⁷⁷

IV. THE FUTURE OF THE C.E.B.

The Act of 1926 is a landmark in the history of electricity supply. After over 25 years of technical advance cramped by parochial legislation and local self-sufficiency, the importance of national electricity development was at last appreciated, and steps were taken to bring the organisation into line with technical needs, at least for the production side of electricity supply.

The solution found has certain weaknesses, mainly due to an exaggerated protection of existing interests ; but it is distinguished from earlier compromise solutions in that the motive force of reorganisation was never sacrificed in spite of all concessions made : a strong central planning and executive body was created with the power of compulsion, should persuasion and consultation fail. It is a tribute to the effectiveness of the Act that all major issues could actually be settled by agreement.

The method of reform adopted was particularly designed to minimise the loss of power and prestige of the existing interests,

¹⁷³ Act, s. 28 and 30.

¹⁷⁴ *Ibid.*, s. 18.

¹⁷⁵ *Ibid.*, s. 25.

¹⁷⁶ Ruling of Chairman of Committees, 6-5-22, *Parl. Deb.*, H.C., Vol. 265, c. 1449.

¹⁷⁷ O'Brien, *loc. cit.*, p. 84 ; cf. L. Gordon, *loc. cit.*, p. 111-112.

but in so doing it necessarily accepted certain undesirable aspects of the *status quo*. Thus the special rates of supply to selected stations are bound to prolong the inequality of wholesale costs of electricity, and place undertakings with small plant or without their own stations at a disadvantage.

The separation of ownership and control over a selected station is so far-reaching that it is claimed that the profit incentive of the owner is no longer directed towards achieving the highest efficiency in generation, as "too little discretion remains with the owner signally to affect the cost of production."¹⁷⁸ On the other hand, the dual system of local operation and central control is not likely to ensure the highest efficiency of generation, and a widely-held view expressed in the I.M.E.A. Memorandum on the Ownership of Distribution Undertakings, Ownership of Generating Stations and National Standard Bulk Supply Tariff, 1944, recommends that the complete responsibility for planning, construction, development and operation, be vested in one competent body such as the C.E.B. The advantages claimed from the transfer of all stations to the Central Board are the possibility of a long-term programme, substantial saving in engineering costs, close comparison of results and methods, which would raise the general standard of efficiency, the possibility of utilising low-grade fuels by the design of special stations (the importance of which, as part of a national fuel policy, will be discussed in a later chapter); the control of purchase of generating plant, improvement in the standard of technical ability amongst power station engineers, designers and operators by the organisation of training, interchange of staff, etc.

Selected station owners in the I.M.E.A. strongly objected to such a transfer and expressed the fear that centralisation would lead to stagnation and bureaucratic uniformity. Doubt was expressed in other circles whether the dislocation caused by the transfer of stations, etc., would not outweigh the theoretical improvement in economy.¹⁷⁹

Whatever the advantages or disadvantages of the present organisation, the future development will be largely determined by the measures adopted for the reorganisation of the distribution side of electricity supply. Any scheme involving the partial or

¹⁷⁸ L. Gordon, *The Public Corporation in Great Britain*, p. 152.

¹⁷⁹ J. R. Beard, *loc. cit.*, p. 26.

complete elimination of the existing undertakings would automatically destroy the basis of the present dual system and would strengthen the case for the concentration of generation and transmission in one authority. Even if electricity distribution is reorganised on a regional basis, it would appear advisable to develop generation and transmission as a single service.

CHAPTER IX

THE PROBLEM OF ELECTRICITY DISTRIBUTION

I. THE PRESENT POSITION

(1) *Intensive Development*

THE fundamental purpose of the 1926 Act (as of the 1919 Act, which failed) was the reduction of prices and the greatest availability of electrical energy. In 1926 the problem was tackled from the generation and transmission side and the reorganisation was successful in reducing generating costs. To what extent was this reflected in cheaper prices to the final consumer?

Generating costs form only a part, and not even the larger part, of the total costs incurred in the supply of electricity to the public. Distribution expenses, of which more than half are capital charges, have acquired an ever-increasing importance. The following figures will give some idea of the importance of fixed charges in electricity supply.¹

<i>Proportion of total cost of supply per unit due to</i>	1922-3	1928-9	1934-5
A. Distribution capital charges and surplus	22.6%	26.7%	31.2%
B. Distribution, total cost ..	39.7%	48.4%	55.6%
C. Generation capital charges ..	23.2%	21.7%	18.1%
Total capital charges (A and C)	45.8%	48.4%	49.3%
Total cost exclusive of generation working costs (B and C)	62.9%	70.1%	73.7%

It will be noted that nearly three-quarters of the cost of electricity is determined independently from power station efficiency, and it

¹ Extracted from J. A. Sumner, *J.I.E.E.*, 81 (1937), p. 445, Table 10

must be remembered that this in turn depends on the demand curve and the load factor, or, in other words, on the efficiency of the distribution side of the undertaking. It follows that even a considerable reduction in the prime cost of generation will only lead to a relatively slight cheapening of total cost.

On the other hand, the price of electricity can be substantially reduced by a more intensive demand which would enable capital charges to be spread over a larger number of units.

This close inter-relation between consumption and price has a cumulative effect: high consumption will lower costs which, in turn, will stimulate consumption. A chart submitted to the Weir Committee by Mr. Kennedy² illustrates as much the effect of consumption on prices as that of prices on consumption, although the Weir Committee only stressed the latter aspect. Quigley drew the conclusion that, with a more intensive use of electrical power, low prices would result more readily than by reliance on low prices to attract industry to the use of electric power. Other countries had electrified not because electric power was cheap, but because it was more efficient than other forms of power.³

Sumner claims that demand for electricity is inelastic at an average charge of 2½d. per unit and more, but that below that figure demand becomes elastic, i.e. that a small reduction in price leads to a more than proportional increase in consumption with the result that revenue per consumer increases.⁴ He does not, however, prove that a reduction in price would automatically have the desired result and various speakers in the discussion of his paper stressed the vital importance of an active selling campaign which, generally speaking, depends for success on reasonable charges.

Electricity development in Great Britain has been criticised as being backward and slow in comparison with the consumption per head of population in other countries. The Weir Report gives statistics in Table 2, which it calls "disquieting." Great Britain was at the bottom of the list with a consumption of 110 units per head of the population per year from authorised undertakers (and an estimated total of 200 from all sources of supply), compared with 500 units in Scandinavia and the whole of the United States, 800 in the North-eastern States of the U.S.A. (which are more

² *Weir Report, loc. cit.*, p. 6.

³ H. Quigley, *Electric Power and National Progress* (1925), pp. 55-6.

⁴ J. A. Sumner, *loc. cit.*, pp. 434, 438.

closely comparable with Great Britain in industrial development), 900 in Canada, and 1,200 in California.

The development in the United States was not due to exceptionally low tariffs or the absence of competition from other fuels nor was it accompanied by low gas consumption.⁵ Our unsatisfactory record may be due to one of two reasons, or partly to both: a limited use of electricity by consumers or the fact that a part of the population was still without electricity. The latter factor can be eliminated by calculating the consumption figures per user, but these are likely to be misleading, as they include the fluctuating power consumption. In the absence of actual statistics an estimate of the domestic consumption figures has been made by Sumner.⁶ The figures vary considerably from year to year with the impact of new connections of low consumption users. The average for 1934-5 amounted to 765 units, but a detailed analysis carried out at that time shows that 72 per cent. of the total undertakings, with annual sales of less than 10 million units and embracing 20 per cent. of the consumers, reached only an annual consumption of 378 units. One cannot but agree with the conclusion that domestic supplies were grossly under-developed, particularly in many of the smaller undertakings. Considering that some undertakings reached an average of 2,000-3,000 units as far back as 1925, there is, no doubt, considerable scope for further progress. In 1939-40 the consumption for lighting, heating and cooking amounted to 8,690,039,643 units and the number of consumers was 10,563,997. Assuming domestic consumers as 86 per cent. of the total, as in previous years, the average domestic consumption per user was 956, a rise of 25 per cent. in five years.

The lack of intensive development can also be shown in other ways. In an important paper to the Institution of Electrical Engineers, Mr. J. M. Kennedy and Miss Noakes showed that distribution costs per unit can be reduced in direct proportion to the increase in the units sold per £ of distribution capital, or, as they call it, in the distribution capital efficiency.⁷ This figure amounted to 48 units per £ in 1924-5, but dropped to 41.6 in 1930-1 and further during the Great Depression, 1931-3, after which it rose and reached the 1925 level again 10 years later. A rapid increase after 1934 seemed

⁵ *I.M.E.A. Proc.* (1939), p. 9.

⁶ *Loc. cit.*, pp. 430 ff.

⁷ *J.I.E.E.*, 73 (1933), pp. 157 ff.

to disprove the expectation of Kennedy and Noakes and also the McGowan Report that distribution efficiency would remain low, but it should be noted that even in 1937-8 the figure of 50 units per £ was only just exceeded.⁸ There is a considerable variation in the efficiency of various undertakings and Table 2 of the McGowan Report records a direct rise with increasing size of electricity undertakings.

There are various reasons for the lack of improvement in distribution capital efficiency. A strong extensive development, especially in sparsely-populated areas, may counteract the intensive progress made in other areas owing to the high capital cost involved in giving supply for an initially small consumption. The existence of such a trend can be checked with reference to the statistics of distribution capital expended per consumer, but, as these had a falling tendency, Kennedy and Noakes denied that this was an important factor.⁹ The trade depression reduced the industrial load and thus increased the relative importance of the small consumption domestic user. The share of domestic consumption in the total increased from 19.4 per cent. in 1921 to 30.3 per cent. in 1930-1 and 38.6 per cent. in 1934-5.¹⁰ Changes in technique, such as the use of more elaborate switchgear and protective equipment, increased distance from station to consumer as a result of the reduction in the number of the generating stations with the formation of the grid, the expenditure on frequency standardisation charged to capital account and heavy rating assessments have also been indicated as factors which kept distribution capital efficiency low.¹¹ Whatever the importance of these, it must be agreed that progress since 1926 has been patchy, and that electrification in some areas has been regrettably slow, even if measured only by the performance in other and comparable parts of the country.

(2) *Extensive Development*

The success of the 1926 legislation must also be judged by the progress made in the extension of electricity supply both to new consumers in the areas where supply was already available and to new and hitherto undeveloped districts.

⁸ *Ibid.*, p. 108; *I.M.E.A. Proc.* (1939), p. 25.

⁹ *Loc. cit.*, p. 157.

¹⁰ *Ibid.*, p. 108; Sumner, *loc. cit.*, p. 440.

¹¹ J. Eccles, *J.I.E.E.*, 81 (1937), p. 473.

There had been a steady improvement in the position even before the passing of the Act, and the Electricity Commissioners could report in 1928 that the majority of areas possessing the higher average densities of population and thus presenting the better prospects of development on a remunerative basis, had already been occupied, i.e. were in the area of supply of some undertaking. Fifty-five per cent. of the total area of Great Britain was occupied containing 95 per cent. of the total population ; as much as 82 per cent. of the area and 69 per cent. of the population in rural distribution districts existing in 1928 had been authorised since 1920.¹³ By 1934 over 86 per cent. of the area and 99 per cent. of the population of this country were within electricity distribution districts. These figures, however, only relate to areas covered by distribution rights and do not give a true picture of the actual development. The *Economist* felt it necessary to issue a warning against a policy of concession hunting and a widespread speculative movement in distribution rights which had been brought into the industry ; it also complained about the unprogressive policy of large companies which wanted to retain reserves of demand and acquired distribution rights without a plan or basis for development. It drew attention to the situation in the Midlands, North Wales and Lancashire, where power companies covered 3,860 square miles of which only 28.4 per cent. were supplied with electricity ; in 40.6 per cent. distribution had been " authorised " but not commenced, and 31 per cent. were entirely untouched.¹³

Complaints were raised that areas were allocated to statutory undertakings without regard to the possibility of giving a proper and low price supply, that orders had been granted to authorities without competent staff or the enterprise necessary for successful rural development.¹⁴

A better appreciation of the extent of development and the possibilities of improvement will be gained by referring to the number of premises actually supplied with electricity. According to an estimate by Kennedy and Noakes, as late as 1933 only 30 per cent. of the inhabited houses were being served by authorised undertakers,¹⁵ which rose to approximately 35 per cent. in 1934,

¹³ *El. Com. 8th Annual Report (1927-8)*, pp. 14-15.

¹³ *Economist*, 106 (1928), pp. 1068, 1173.

¹⁴ *J.I.E.E.*, 70 (1931), p. 264.

¹⁵ *J.I.E.E.*, 73 (1933), p. 108.

namely to 4.2 million domestic consumers out of 12 million separate families.¹⁶ A survey carried out by the Electricity Commissioners at the end of 1934 actually disclosed that out of 12,535,000 premises about 6,650,000, or 53 per cent., were connected, the corresponding percentage for domestic consumers alone being 52 per cent.¹⁷ A later survey showed that in 1935-6 59.4 per cent. of the premises had been connected, an increase of 15.1 per cent. in a year.¹⁸ The 1944 report of the I.E.E. Post-war Planning Committee states that out of approximately 10.7 million urban houses 74 per cent. were supplied with electricity in 1939, to which must be added the 1.25 million rural consumers, making a total of 9.15 million out of 12.95, or nearly 71 per cent. The ratio of population to consumers was halved in four years prior to 1933-4 and fell again from 7.5 to 4.9 until the outbreak of the war.¹⁹ But even at the end of 1934 over 8,000 miles of urban streets, or 20 per cent., were without electric mains.²⁰

Legislation contributed to the extension of electricity supply in a number of ways, by imposing obligations on undertakers and by abolishing restrictions and limitations. On the strength of Sec. 8 of the 1919 Act, which instructed Joint Electricity Authorities to develop unoccupied areas within their districts, the Commissioners made provision in the Electricity District Orders:—

- 1) for the submission, within a prescribed time, by the district authority of proposals for securing a supply of electricity in areas not forming part of the area of any authorised distributor;
- 2) for the carrying out within a definite period of such proposals to the extent approved by the Electricity Commissioners.

The compulsory laying of certain mains had always been a feature of British electricity legislation and was one of the conditions included in the provisional orders under the 1882 Act,²¹ but the new instructions went considerably further. Similar obligations were imposed by Parliament upon companies applying for a special Act authorising the supply of electricity over large areas.²² The

¹⁶ Cf. *El.*, 113 (1934), p. 491.

¹⁷ *El. Com. 16th Annual Report* (1935-6), p. 8.

¹⁸ *El. Com. 17th Annual Report*, (1936-7) p. 7.

¹⁹ G. D. Bond, *Electrical Industries*, Vol. 41, p. 178.

²⁰ *McGowan Report*, par. 359.

²¹ *El. Lighting (Clauses) Act*, 1899, Schedule S 21 ff.

²² *El. Com. 9th Annual Report* (1928-9), p. 14.

simplification of procedure for the establishment of J.E.As. in the 1926 Act was probably mainly designed to increase the number of J.E.As. as suitable authorities for the proper reorganisation and development of electricity distribution and the purpose of Sec. 37 was specifically to enable J.E.As. to carry out such work. As Joint Authorities failed to gain any popularity, a number of areas remained without an authorised undertaker responsible for their electrical development.

The Weir Committee had been fully alive to the possibilities of development in sparsely-populated areas through which grid lines passed, and examined the best means of encouraging distribution in districts where no statutory undertaker existed. They were emphatically opposed to giving the Central Electricity Board any distributing powers, except perhaps to large industrial consumers,²³ and recommended a new type of supply company which would embody the more desirable features of both power and distribution companies. Companies should be created by special order to supply for all purposes in wide areas, but they should be subject to compulsory purchase after 50 years, exercisable by an authority responsible for the whole area, viz. a J.E.A. or an association of local authorities.²⁴ The 1926 Act adopted this proposal,²⁵ and provided for compensation on the basis of original cost of capital, land, etc., less depreciation. The purpose of the clause was the encouragement of enterprising development companies, subject to eventual public control, but without the danger of large integrated distribution areas being carved up amongst a number of local authorities. By 1934 seventeen special orders were in force to which the provisions of this clause applied.

The 1926 Act did nothing else to encourage a speedy extension of electricity supply, except that it removed, for the benefit of undertakers, a number of restrictions and obstacles. It was made easier to obtain way-leaves for overhead wires (Sec. 44) and to remove obstacles such as trees (Sec. 34). Local authorities were at last authorised to sell, install and maintain electric fittings and apparatus to consumers (Sec. 48): this enabled them to initiate assisted wiring schemes which have proved of the utmost importance

²³ *Weir Report, loc. cit.*, s. 75.

²⁴ *Ibid.*, s. 77.

²⁵ *Electricity Supply Act, 1926*, s. 39.

for the extension of electricity to small householders. By 1935 76 per cent. of all undertakers were offering such schemes.²⁶

A report on assisted wiring and the hire purchase of electrical apparatus published by the Electricity Commissioners in 1930 stressed the importance of assisted wiring which it suggested should be made available by all undertakings. Wherever the system was introduced, it led to a considerable increase in the number of consumers. This applies particularly to artisan dwellings in towns and cities, whose occupiers are unable or unwilling to put down the £5 or £6 required for the wiring of the house, but are readily prepared to pay a little extra per week for it. In a particular town 14,000 small dwellings were connected in seven years by assisted wiring, amounting to 35 per cent. of the total domestic consumers.²⁷

(3) *Rural Electrification*

Supply to rural districts is a particular problem which, because of its social and political implications, has occupied a great deal of thought and time. The construction of the grid, with transmission lines stretching all over the country, naturally raised widespread hopes that electricity would shortly be available in every part. Rural electricity appeared to be the best method of ensuring the future of British agriculture, of counteracting the migration from country to town.

Rural electrification does not cover farms only ; on the contrary, a large proportion of the consumers and an overwhelming part of consumption are not agricultural but domestic and industrial. In 1929-30, 90 per cent. of the consumers in rural areas were domestic, whereas 80 per cent. of the units sold went to factories, works and other power users. In that year there were 203,000 rural consumers, which constituted only 4 per cent. of the total potential number of users²⁸ ; the mileage of mains in rural areas rose from 3,700 in 1929 to 18,000 in 1936, and the farms connected from 600 in 1926 to 4,000 in 1932 and 30,000 in 1937, with a pre-war annual increase of 5,000 farms.²⁹ This was encouraging progress, but a little slow, bearing in mind that the total number of farms in Great Britain amounts to about 450,000.

²⁶ *El. Com. 16th Annual Report* (1935-6), p. 9.

²⁷ F. E. Spender, *J.I.E.E.*, 80 (1937), p. 43.

²⁸ *El. Com. 10th Annual Report* (1929-30), p. 22.

²⁹ *J.I.E.E.*, 82 (1938), p. 339 ; *El.*, 131 (1943), p. 196.

Rural electrification, as is natural under the existing organisation of electricity supply, proceeded along somewhat haphazard lines, extending first to semi-suburban districts and then concentrating on the development of those areas where, for special reasons, such as the existence of a promising power load, supply could be expected to be a satisfactory financial proposition. As a result, the development was uneven. It has, however, been stated that by 1939 supply was available in practically all villages of more than 500 inhabitants and that two-thirds of all premises in rural areas had been connected.³⁰ In a large rural undertaking more than 75 per cent. of potential consumers are connected, including villages of less than 250 inhabitants.³¹

In 1927 the Minister of Transport asked the Electricity Commissioners to investigate the practicability of a more rapid rural electrification and to prepare schemes for demonstrating the potentialities of electricity supply in rural areas. At the same time a conference on electric supply in rural areas was called together which made recommendations.³²

The first development scheme was in the neighbourhood of *Bedford* and had the object of providing for the comprehensive and rapid electrification in a typical rural area where electricity had not been available, so that within a period of two years supplies for all purposes would be within reach of practically all the inhabitants of the district. The Treasury agreed to make advances to the Corporation of Bedford from the Development and Road Improvement Fund during a maximum period of 10 years of 75 per cent. of the annual deficits on working, to be repaid from later surpluses.³³ The scheme commenced in April, 1930, covering an area of 109 square miles and a population of 23,400. In November, 1930, a second demonstration scheme on similar lines was started at *Norwich* covering an area of 125 square miles and a population of 13,744. This is a highly-developed district in which 95 per cent. of the land is under intensive cultivation. At the recommendation of the Unemployment Grants Committee, the Minister of Labour made a grant to the Norwich Corporation of 50 per cent. of the

³⁰ *El. Rev.*, 132 (1943), p. 607.

³¹ *El. Rev.*, 134 (1944), p. 767.

³² *El. Com. 9th Annual Report* (1928-9), p. 28 ff.

³³ *El. Com. 10th Annual Report* (1929-30), p. 37.

interest on loans raised for certain parts of the scheme for a period of 15 years.

Whilst these two experiments were carried out under the close control of the Electricity Commissioners, two other rural development schemes were undertaken by two Scottish County Councils. One was that of the *Dumfries* County Council covering an area of 1,175 square miles and a population of 60,046, a typically rural area with a considerable amount of moorland and with agriculture as the staple industry. The work was undertaken in anticipation of actual demands and the Unemployment Grants Committee promised assistance to the extent of 100 per cent. of the interest on the capital raised for certain works during the estimated period of construction and 50 per cent. for the remainder of a period of 15 years. Owing to the purely rural character of the scheme, it was expected to give useful information regarding the possibilities of rural electrification on a comprehensive basis.³⁴

The neighbouring County Council of the Stewartry of *Kirkcudbright* also decided to develop electricity supply throughout the district, covering nearly 900 square miles with 30,341 inhabitants. A considerable part of the area consisted of mountains, moors and lochs, but there is a pastoral area which is notable for dairy farming.³⁵ The progress of the individual schemes is recorded in the annual reports of the Commissioners and summarised in a survey by G. V. Harrap,³⁶ from which most of the information given in this section is extracted.

The most striking feature is the subordinate importance of the actual farm load. Bedford is in a special category owing to the existence of large brick works within the experimental area which increase the industrial sales to 67 per cent. of the total and thus vitiate the usefulness of the demonstration scheme. In the other schemes, as late as 1938-9, supplies to farms formed an unimportant part of the consumption, as will be seen from the following table.³⁷

³⁴ *El. Com. 16th Annual Report* (1935-6), p. 29.

³⁵ *Ibid.*, p. 34.

³⁶ *J.I.E.E.*, 81 (1937), pp. 641 ff.

³⁷ *El. Com. 19th Annual Report* (1938-9), p. 64.

SHARE OF FARMS AND POWER CONSUMERS IN TOTAL CONSUMPTION

<i>Scheme</i>	<i>Farms</i>		<i>Factories and other power consumers</i>	
	<i>% of Consumers</i>	<i>% of Units</i>	<i>% of Consumers</i>	<i>% of Units</i>
Bedford	4½	under 3	¾	67
Norwich	8½	13½	under 1	7½
Dumfries	7	13	1	18
Kirkcudbright	5	13	4	28½

On the other hand, the consumption per farm is considerably higher than the average per domestic consumer, as the statistics for 1936-7, the latest available figures, show.⁸⁸

AVERAGE ANNUAL CONSUMPTION PER CONSUMER

	<i>Farms</i>	<i>Domestic</i>
Whole country	1,637	500
Bedford	1,900	848
Norwich	877	443
Dumfries	1,610	780
Kirkcudbright	2,250	500

The financial results of the various schemes are rather varied. Both Bedford and Norwich have consistently had deficits, Dumfries showed a modest surplus after two years because of the interest grants and the suspension of loan repayments, but was reaching complete self-sufficiency by the outbreak of the war ; Kirkcudbright achieved a surplus from the very beginning.

The results of the demonstration schemes and the experiences in other areas lead to the following conclusions :—

1. There is a considerable potential demand from rural districts, both domestic and farm, the latter being more substantial in dairy farming areas, with their larger needs for mechanical apparatus. For the success of a scheme it is necessary to cultivate a high proportion of domestic users who may be expected to congregate in villages and thus constitute a reasonably concentrated load ; where

⁸⁸ *El. Com. 17th Annual Report (1936-7), App. A.; El. Com. Returns (1936-7)* LXXXI.

electricity can also be utilised for power purposes in rural industries, the chances of success are considerably improved.

2. The question of whether the cost of supply in rural areas is higher than in urban districts has not found a generally agreed answer. Whilst it is conceded that the utilisation of a mile of cable is very much greater in a densely-populated area, the higher cost of underground services is claimed to go a long way to evening-out expenses. Mr. Pickles, the engineer of the Dumfries County Council, found that the total cost per consumer can be restricted to a figure which corresponds very closely to the costs incurred in densely-populated areas.³⁹ an experience confirmed by the McGowan Committee (par. 376), Mr. J. R. Beard⁴⁰ and Mr. J. M. Kennedy.⁴¹ The contrary view is taken by Prof. Dennison in his minority report of the Scott Report. Mr. Melling draws attention to the higher operating costs in rural areas owing to the longer man-hours involved in transport, meter reading, service and the difficulties of showroom facilities, and claims that in the experience of several large rural undertakings the cost is materially higher than in urban areas.⁴² The cost of rural supply was further increased by restrictions and regulations regarding the use of overhead lines. In Great Britain an 11 kV line costs between £350 and £650 per mile, against £200 in New Zealand and £110 in India.⁴³ The new technique of cable ploughing developed during the war may, under favourable conditions, render the laying of underground mains more economical than overhead wires for transmission lines up to 11,000 V, and, on the other hand, the development of high voltage overhead light lines designed to reach outlying farms at low cost are likely to reduce the cost of individual connections to a considerable extent.⁴⁴

3. The methods of successful development are the same as for urban districts. The good results obtained in Dumfries have been largely due to the vigorous canvassing and demonstration, the liberal facilities for hire and hire purchase and assisted wiring and to the principle that supplies are given without any guarantee or

³⁹ *J.I.E.E.*, 82 (1938), p. 334.

⁴⁰ 3rd World Power Conference, 1936, *Proc.*, Vol. VIII, p. 252.

⁴¹ *J.I.E.E.*, Vol. 90, II, p. 132.

⁴² *J.I.E.E.*, *loc. cit.*; *J.I.E.E.*, 90, I, p. 315.

⁴³ E. H. Jesty, *Bulletin Union des Ingenieurs and Techniciens de la France*, No. 4, March-April, 1943.

⁴⁴ Cf. W. Fennell, *Electrical Industries*, Vol. 44, p. 80.

contribution to capital expenditure.⁴⁵ The investment has to be made on a large and generous scale, mains of adequate capacity for long-term development must be installed in the first instance, if high additional expenses later and delay in development are to be avoided.

There is one additional requirement which has, at least in the past, conditioned the success of rural development, namely the use of overhead lines wherever possible so as to keep capital costs to a minimum. It is essential to find the right compromise between cheapness and safety and to weigh the aesthetic objections to overhead lines against the very real advantages they can bring to the rural population.

4. The size of the rural undertaking is of great importance; small units are in general incapable of developing rural electricity as they cannot secure the services of a first-class technical and administrative staff essential for the success of the venture. The conference on rural supply held in 1931 discussed the effects of the small size of a number of undertakings operating in certain areas and passed a resolution asking the Electricity Commissioners to consider what steps could be taken with a view to the economic grouping of rural areas into appropriate units for their efficient development. Later on they re-affirmed this resolution.⁴⁶

The unit of area must be large enough to embrace practically all the potential sources of revenue and load development to be found in the countryside. If electrification is taken in hand sporadically in small areas or on the basis of supply being given to more lucrative villages and larger individual power users, the problem of a general supply would become more difficult.⁴⁷ Messrs. Dickenson and Grimmit suggested an area of not less than 400 square miles and possibly three to four times that size⁴⁸; Mr. Borlase Matthews postulated a considerably larger unit with a population of at least 120,000, which, assuming a population density of 60 per square mile, means approximately 2,000 square miles.⁴⁹ Mr. Beard referred to the experiences of a group of utilities where it was found that an increase of area to 3,000 square miles brought great savings in

⁴⁵ *El. Com. 16th Annual Report* (1935-6), p. 33; *J.I.E.E.*, 82 (1938), p. 348.

⁴⁶ *El. Com. 12th Annual Report* (1931-2), p. 40; *ibid.*, 15th *Annual Report* (1934-5), p. 36

⁴⁷ *J.I.E.E.*, 70 (1931), p. 191.

⁴⁸ *Ibid.*

⁴⁹ *J.I.E.E.*, 76 (1933), p. 20.

expenditure and administration.⁵⁰ G.H. suggested an area of 5,000 square miles as being the most successful unit.⁵¹

5. A sufficient size of the unit is not the only condition upon which a successful rural electrification scheme can be built. It is just as important that the consumption be sufficiently varied and diversified to ensure a favourable load factor of the undertaking both during the day and through the year. There is a considerable body of expert opinion convinced that for this reason rural electrification should be undertaken from and around an urban nucleus. The McGowan Committee reaches the same conclusion and refers to evidence that, where rural areas have been developed in conjunction with urban centres, the organisation has been extended at a comparatively low increase in cost to deal with the development in the added rural part (par. 388). The Cooper Committee on Hydro-electrical Development in Scotland re-affirms the view that without a reasonably dense and concentrated population of consumers in urban areas with which adjoining rural areas can be associated . . . a cheap general supply of electricity in such rural areas is impossible (par. 57).

On the other hand, the experience of the Dumfries and Kirkcudbright schemes shows that purely rural development is possible without appreciable deficits in the early years and that there is reasonable hope of financial stability after five years. Further, it has been claimed that the technical and commercial needs of rural supply are so different from urban practice that it should not be undertaken by engineers who have specialised in urban development. The latter point becomes a question of personal ability of the engineer to adapt himself to new conditions, but constitutes a reason why rural electrification should not be regarded simply as a question of the enlargement of existing urban undertakings through the absorption of surrounding rural districts.

Mr. Cameron Brown suggested the appointment in each supply undertaking of a full-time rural specialist, or where the area was too small to warrant this, one expert should be asked to serve two or more areas. His function would be to overcome the ignorance and apathy towards electrical aids to farming which had so far delayed rural electrification.⁵² It is interesting to note that one of the largest

⁵⁰ 3rd World Power Conference, 1936, Vol. VIII, p. 253

⁵¹ G.H., *Socialisation of the Electric Supply Industry*, p. 48.

⁵² *El. Times*, 106 (1944), p. 94 f.

electricity holding companies with considerable rural areas has appointed agricultural and electrical experts of repute to foster rural development.

In conclusion, it appears that rural electrification will not as a rule be a very profitable investment. Its best chance of success is when carried out on a large scale in conjunction with a substantial urban supply, but, even so, subsidies may be necessary if service is to be given at a cheap rate. These may take the form of a Government grant, as suggested by the Joint Committee of Electric Supply Organisations Memorandum 1944, or a levy on the industry, if electricity supply remains on the basis of independent groups of undertakings. Even reorganisation with Regional Boards would leave certain areas predominantly rural and therefore possibly unable to finance their own development. Whether a new organisation of the industry is necessary for a full rural electricity development will be discussed later.

II. REASONS FOR THE UNSATISFACTORY PROGRESS

In the early inter-war years electricity was to a very large extent only used for lighting purposes and had not been widely adopted for heating and other domestic uses. It had become more popular as a source of industrial power during and after the first World War, as the need for coal conservation and the rapid growth of new industries in the South at the expense of the old-established and conservative staple industries of the North had removed many obstacles. The greater efficiency of generation, coupled with the increase in the price of coal in the late 1930's, made electricity more economical compared with other sources of power, and the growth of small luxury industries at the expense of the heavy industries also favoured electric power. The electrical motors installed in this country numbered 2½ million h.p. in 1912, 6½ million in 1924, 9 million in 1930 and approximately 12 million in 1936.

Electric progress, although affected by trade cycle conditions, shows a steady and increasing upward trend, and in 1938 consumption was nearly twice that of 1929, whereas industrial production in general had only increased by 15 per cent. In the years of Trade Depression (1929-33) domestic development compensated for the fall in industrial power consumption, with the result that the increase continued, although the rise amounted to only 5 per cent. Between

1932-7 the average annual growth was 12 per cent.. At the same time, the increase in the relative importance of domestic electricity rendered the industry more and more immune from trade cycle influences, as the income elasticity of electricity consumption, i.e. the way in which consumption is affected by variations in the incomes of consumers, must be fairly low.

Whilst the average figures show a steady progress in domestic electrification, this was by no means universally true; on the contrary, there were extraordinary differences between undertakings, due to a variety of reasons, which will now be examined.

(1) *Lack of Effort*

Undoubtedly there were authorities which made no great efforts to increase their sales of electricity. The Weir Committee had to report "a serious lack of organisation in the encouragement of the use of electricity, especially by domestic consumers," compared with America, where the "great supply systems have developed the business of selling electricity into a very fine art with the result that there has been a rapid increase in the consumption of electricity."⁵³

Some authorities were afraid to encourage an extended use of electricity for domestic purposes, as it would necessitate further capital expenditure. This reluctance found expression in high tariffs for domestic supply where such a load might prove a source of embarrassment to an existing system,⁵⁴ and in considerable delay and complication before electricity was made available to prospective consumers.⁵⁵

The absence of serious effort was partly due to a lack of interest in distribution; for "those responsible for the industry had been so engrossed in the race for lower generating costs"⁵⁶ that they had forgotten about the distribution side. This preference for the heavy engineering part of the industry also found expression in the higher status enjoyed by the engineer compared with the manager of supply undertakings, which was criticised by the Weir Committee.⁵⁷

In promoting the 1926 Bill, the Government spokesmen expressed the hope that undertakers who were not showing as

⁵³ *Weir Report, loc. cit.*, s. 103.

⁵⁴ *El. Com. 7th Annual Report* (1926-7), p. 14.

⁵⁵ *El. Rev.*, 100 (1927), p. 826.

⁵⁶ J. M. Kennedy, *El. Rev.*, 115 (1934), p. 542.

⁵⁷ *Weir Report, loc. cit.*, s. 107.

much enterprise as they should, would concentrate on distribution when their pre-occupation with the generating side of their business was removed.⁵⁸ Undoubtedly this hope was underlying the brightly-coloured pictures of cheap and abundant electricity for everybody under the new Act, which were drawn in political circles and in the daily Press. As the national interest and the self-interest of the undertakers were practically identical in regard to the advantages of an intensive development of electricity supply, this hope was not unreasonable, assuming that the existing organisation of distribution was sound and rendered quick progress possible.

Unfortunately, this expectation did not come true and in 1931 Mr. Herbert Morrison, as Minister of Transport, held a number of conferences with supply authorities during which he referred to the reluctance of many undertakers to provide mains in streets until sufficient potential consumers were secured to ensure financial success from the outset. He urged a speedier development and a changeover from direct to alternating current. In 1936 high prices and little development were still noticeable in areas where there was sufficient scope for a more progressive policy.⁵⁹ P.E.P. claimed that many supply undertakings were unable or unwilling to supply the low income consumer.⁶⁰

(2) *Unsuitable Size of Undertakings*

The lack of effort which has been observed in some undertakings is by no means entirely due to the inactivity and unenterprise of the responsible authorities. Frequently it is the result of the limitations imposed by their size; a small undertaking necessarily lacks the scope for development and may also lack the financial resources without which utilisation of modern selling methods and introduction of hire and hire-purchase facilities and assisted wiring schemes is impossible. In a small undertaking there is no scope for specialised expert staff and the available funds may be insufficient to attract capable engineers. These disadvantages are contributing factors to the vicious circle of low consumption causing high charges which, in turn, discourage any increase in consumption. Reference has already been made to the statistics shown in Table 2 of the McGowan Report, which compares the

⁵⁸ Col. Ashley, M.O.T., *Parl. Deb.*, H.C., 29-3-26, Vol. 193, c. 1696.

⁵⁹ Prof. Miles Walker, *J.I.E.E.*, 79 (1936), p. 510.

⁶⁰ P.E.P. *Report on the Supply of Electricity in Gt. Britain*, (1936) p. 59.

results for the year 1933-4 of the electricity undertakings grouped according to the units sold during the year. The consumption per user and the distribution capital efficiency rise with the increasing size of the undertaking, whilst distribution costs fall. More detailed statistics for smaller groups of undertakings given in Tables 2 and 6 of Sumner's paper⁶¹ confirm this trend, although they show certain irregularities in the distribution capital efficiency.

The increase in costs, especially capital charges, in the lowest consumption groups of supply undertakings is so great that a supply at less than 2½d. per unit—a price at which demand becomes elastic—would mean a considerable loss in the short run, and many undertakings may be quite unable to take a long-term view owing to their straitened financial condition and limited tenure. The conclusion is inescapable that certain supply undertakings are unable to overcome their disabilities by their own efforts and that their salvation lies in a thorough-going reform, such as an amalgamation with other undertakings into larger units.

The McGowan Report recommended that all undertakings with annual sales of less than 10 million units should lose their independence; J. R. Beard drew the dividing line higher, at 20 million units.⁶² Statistical averages may hide considerable differences and variations from the mean, and conclusions must, therefore, be drawn with care. It would be as wrong to brand all small undertakings as inefficient as to hail all large authorities as progressive. The McGowan Committee acknowledged the fact that in certain areas small undertakings had adopted a progressive policy and, owing to favourable local conditions, could charge lower prices than some of the larger undertakings.⁶³ Nevertheless, they recommended the retention and utilisation of the larger and more efficient existing undertakings and the absorption of the smaller or less efficient ones.⁶⁴ The reason given is that the object of reorganisation was not merely to achieve exceptionally low costs in a few small and especially favoured areas, but rather to have the same or lower costs available over wider districts.⁶⁵

It is unfortunate that so much emphasis has been laid on the size of undertakings, which is only one aspect of a most important

⁶¹ *J.I.E.E.*, 81 (1937), pp. 431, 439.

⁶² *J.I.E.E.*, 88, I (1941), p. 30.

⁶³ *Loc. cit.*, par. 121.

⁶⁴ *Loc. cit.*, par. 471, IV.

⁶⁵ *Loc. cit.*, par. 122.

condition of successful electric development, namely comprehensiveness. A small town may have a favourably mixed load from domestic and power users which, in isolation, could be regarded as satisfactory, but the development of surrounding suburban and rural areas may be impossible without the urban nucleus. An amalgamation would be necessary primarily for the benefit of rural electrification, although it would, before long, be an advantage to all parties concerned. The separation of town and country must be overcome to secure a truly comprehensive development.

(3) *Multiplicity of Systems and Voltages*

An important obstacle to full electrical development is the lack of uniformity of systems and pressures at which electricity is distributed. Although alternating current has for a long time been accepted as the superior system, even in 1937 1.12 million consumers out of a total of 9.36 millions still received direct current and both systems were supplied at various pressures. According to the McGowan Report, there are as many as 43 different declared voltages between 100 and 480 V. A survey taken by the Electricity Commissioners in 1929 established that the most widely-used pressure was 230 V, which was consequently adopted as the standard voltage, but even this covered less than 20 per cent. of the total domestic load.⁶⁶ No later figures are available which are strictly comparable, but it was stated that in 1939 50 per cent. of the consumers were supplied at the standard voltage, although 71 per cent. of the undertakers had gone over to the standard.⁶⁷ This situation made an inter-connection of distribution networks impossible, increased the cost of equipment and appliances, necessitated large stocks of lamps and apparatus to be held by manufacturers and wholesalers and deterred consumers contemplating a change of residence, from purchasing electrical equipment.

The director of B.E.A.M.A. (British Electrical and Allied Manufacturers Association) considered a standardisation of pressures as essential as standardisation of frequency, as without it the benefits of large-scale production of electrical appliances could not be reaped.⁶⁸ The Electricity Commissioners have stated that the modernisation of existing distribution systems and the steady

⁶⁶ J.I.E.E., 68 (1930), p. 516.

⁶⁷ I.E.E. *Report of Post-war Planning Committee* (1944), p. 4.

⁶⁸ *Financial Times*, 29-3-26; cf. *Weir Report*, s. 105.

elimination of many of the diverse voltages must be effected if the great potentialities of the domestic load and the advantages of standardised apparatus for a limited range of voltages were to be fully exploited.⁶⁹

In 1930 the Council of the I.E.E. expressed the view that standardisation to 230 V of declared voltages of 220 and 240 V could be effected by a gradual adjustment and with little expenditure, but that the change-over of lower voltages would involve an expenditure of between £10 and £16 million. The Electricity Commissioners were prepared to assist by allowing a wider range of voltage variation for the purpose, the manufacturers were willing to grant preferential discount for the change-over of equipment. Fourteen years later the I.E.E. undertook a further investigation into the problem, when the cost was estimated as £11,650,000 for the standardisation of the lower voltages and £4,700,000 for the higher voltages.⁷⁰

An increase in voltage has financial advantages for the undertaking concerned as it leads to a better utilisation of mains and thus increases the distribution efficiency. A reduction from a higher voltage is disadvantageous to the undertaking except for the general lowering of the cost of equipment that may result from voltage standardisation. It is for this reason that standardisation at 250 V was recently suggested,⁷¹ which would, however, necessitate a change-over of 97.6 per cent. of all connections.

When it is realised that voltage standardisation brings only little direct benefit to an undertaking, the slow progress made, in spite of all the encouragement by the Commissioners, is not surprising. At the same time, the cost of standardisation is growing every year owing to the increasing use of appliances. Clearly standardisation on the existing basis of independent and voluntary change-over must be a slow process; only compulsory action could reach the goal of uniformity at an early date.

(4) *Variety of Methods of Charge*

One of the most obvious faults in the present organisation of the electric supply industry is the immense variety of tariffs. There can

⁶⁹ *El. Com. 7th Report* (1926-7), p. 14.

⁷⁰ *I.E.E. Report, loc. cit.*, p. 6.

⁷¹ W. Fennell, *Electrical Industries*, Vol. 42, p. 41.

be no doubt that this has militated strongly against the universal adoption of electricity in two ways.

- (a) By no means all tariff structures are designed to assist development, some at any rate are unscientific and harmful, many are too complicated to be grasped by the ordinary consumer, with the result that he chooses the relatively expensive flat rate instead.
- (b) The very existence of many different tariffs for similar types of consumers is bound to cause annoyance and bewilderment and makes a prospective consumer less willing to examine carefully the economic advantages of electricity compared with alternative sources of heat and power.

The variety of tariffs is partly due to the desire on the part of undertakings to increase the use of electricity by charging attractive prices for particular types of load, and the peculiar cost conditions of electricity supply strongly favoured the growth of different practices. In the early days of the industry lighting was the only application and high flat rates were not only justified, but necessary. The load factor of the lighting load being very small, any additional consumption, during off-peak periods, was welcomed as long as it contributed more than the very small marginal cost of supplying the additional units of electricity. The desire to attract additional users of current at times other than during lighting hours led to the initiation of separate heating, cooking and power tariffs, tariffs for shops and industry, and, finally, tariffs for special off-peak loads, such as storage and water-heating. A variety of charges may have been an advantage in the early days of electricity as an aid to development, but in the course of time many special rates have lost their justification and usefulness. In many undertakings off-peak loads developed into peak loads, thus completely upsetting the financial basis for the special rates. The present tendency is, therefore, to prefer a generally favourable tariff for all purposes. This does not, however, mean that a general flat rate should be introduced, as suggested by the Scott Committee on rural development, as such a rate would probably be unnecessarily low for inelastic demands, such as lighting, wireless, vacuum cleaners, etc., but would almost certainly be too high for certain elastic demands, such as heating and cooking, and would thus have a distinctly harmful effect.

By common consent the most satisfactory method of charge is a multi-part tariff with a fixed component and a low unit running

charge. The fixed charge is generally considered as a service charge⁷² as the consumer's contribution towards the fixed expenses of the undertaking in consideration of his right to command the immediate use of electricity at any time. It is theoretically related to the potential requirements of the consumer. The most logical method would, therefore, be a fixed charge based on the installed capacity. This would, however, have a deterrent effect on development and is not necessarily fair in practice, as an increase in current consuming devices does not by any means lead to an identical increase in the total amount of electricity consumed at any one time. The methods most widely adopted for domestic users are based either on the size of house (number of rooms or floor area) or on its rateable value.

In 1925 the Commissioners appointed an Advisory Committee to consider what methods of charge for domestic supplies could be authorised as standard methods for adoption at the option of authorised undertakers in place of the flat-rate charges, and hoped that it would be possible to frame a few model or standard methods.⁷³ The Committee, however, found that none of the multi-part tariffs then in use or suggested was sufficiently perfect to be recommended for exclusive adoption by authorised undertakers, although it urged the advantage of introducing two-part tariffs for domestic supply.⁷³ Section 42 of the 1926 Act made use of this recommendation by enabling the Minister to authorise electricity authorities to supply at two-part tariffs only, but there are few, if any, instances where an undertaker was relieved from the duty of offering an alternative flat-rate tariff. The Act did not compel undertakers to adopt a modern tariff, and many of them continued operating on a flat rate. Undoubtedly authorities who offered attractive two-part tariffs with running charges of not more than $\frac{3}{4}$ d. per unit were able to develop a much more satisfactory domestic service than their conservative brethren who were selling far fewer units per head at a much higher revenue.⁷⁴

The 1926 Act granted no power to enforce or even to encourage the gradual unification of methods of charge, but another committee appointed by the Electricity Commissioners to investigate the problem recommended new legislation which would enable the Minister to order authorised undertakers to offer multi-part tariffs

⁷² *El. Com. 5th Annual Report (1924-5)*, pp. 66-7.

⁷³ *Loc. cit.*, 7th Report, p. 31.

⁷⁴ Kennedy and Noakes, *loc. cit.*, p. 105.

as an alternative to the flat rate, and proposed the adoption of a uniform system.⁷⁵

The increase in the use of domestic two-part tariffs is shown by the fact that by the end of 1934 they were offered by 81 per cent. of all undertakers, the two principal methods being the rateable value of premises adopted by 217 undertakers, and the size of premises in use by 161 undertakings.⁷⁶ The variety of tariff structures, however, remained and was not likely to disappear without compulsion, as most undertakers were satisfied with their own particular system. The McGowan Report later on considered the reorganisation of the existing undertakings in larger units an essential condition for the successful adoption of uniform methods of charge and called for legislation giving all consumers a definite right to demand an approved two-part tariff (par. 331-2).

There is an extensive literature on the ideal and scientific tariff, but it is impossible even approximately to determine the cost of individual supplies. The main characteristics of a good tariff should, therefore, be simplicity both from the point of view of the consumer and the undertaker, and at least a rough measure of equality of charges for similar service. Both the rateable value and the size of house methods comply with these demands, but the former method suffers from the diversity of assessments in various areas and the reduction in rateable value with increasing distance from the town centre, which has the effect that revenue on the fixed charge falls where cost of supply rises. This difficulty could be overcome by a zoning system in which a higher percentage is charged in the outer than in the inner zone. On the other hand, it may be decided to subsidise the outer zone user at the expense of the consumer in the inner zone by keeping prices uniform. The size of house method is independent from the accidents of assessment, but favours the modern compact house at the expense of the older types of property, which are frequently larger. A combination of the two methods might be more equitable, but would be rather complicated in application.

A suggestion which would avoid these difficulties is that of a uniform consumer charge. Sumner claimed that the fixed charges of distribution are allocated independently of the consumption⁷⁷ and

⁷⁵ *El. Com. 11th Annual Report (1930-1)*, p. 31.

⁷⁶ *Ibid.*, 16th Report (1935-6), p. 8.

to a great extent determined by the number of consumers.⁷⁷ W. Fennell elaborated this idea and showed that it would be a possible solution provided the new fixed charge is not substantially higher for the small consumer than under the old system.⁷⁸ The proposal has much to commend it, but behind the appearance of equal charges for everyone there is, in fact, a considerable reduction of charges to the large consumer, whose average price per unit will work out substantially cheaper than that of the small consumer.

The I.E.E. Post-war Planning Committee's Report of 1944 recommended the consideration of a special type of tariff based on the floor area principle, namely a domestic variable block tariff in which a number of units, dependent on the floor area, is charged at the existing lighting flat rate and the surplus at a low running rate. This tariff has been in use by some undertakings for many years and was advocated by Mr. Beard at the World Power Conference, 1936.⁷⁹ It has many advantages, but may constitute too radical a departure from present practice to be popular with supply undertakings and consumers. Whatever method is adopted, it must be capable of being incorporated in prepayment meters, which are used in a substantial proportion of domestic premises.

This investigation has only referred to domestic tariffs. Charges for industrial and power users are largely determined in competition with alternative sources of power and are usually of a two-part nature, the fixed component being based either on the installed capacity or on the maximum demand.

III. CONTROL OF PRICES

It has always been an essential part of British public utility regulation that the consumer should be protected from exploitation by companies enjoying a virtual monopoly, and from the early Electric Lighting Acts provision had been made for the fixing of *maximum prices*. This system had remained in force throughout the period with certain minor modifications concerning the revision periods and the right of interested parties to demand revisions.⁸⁰ Maximum prices might have been an efficient means of control in the days when there was only one class of consumer, the user of

⁷⁷ J.I.E.E., 81 (1937), p. 451.

⁷⁸ *Electrical Industries*, 43 (1943), p. 102.

⁷⁹ *World Power Conference*, 1936, Vol. VIII, p. 252.

⁸⁰ Cf. *El. Supply Act* (1922), s. 22.

light, with a relatively inelastic demand. With the increasing variety of applications, it became impossible to fix a single maximum price with any claim to accuracy, as a tariff which would be perfectly reasonable for a lighting load alone may constitute an extortionate price, if the electricity authority caters at the same time for long hour power consumers. Obviously a service, the cost of which consists so largely of capital charges and where the primary running costs vary from an infinitesimal sum in off-peak periods to a high figure if the load necessitates increased generating capacity, is not susceptible to any simple method of price control.

It is not surprising that maximum prices were generally so high that they had little practical significance and were next to no use in preventing exploitation⁸¹; the great majority of Lighting Orders granted prior to 1914 authorised a maximum unit charge of 8d. for all classes of supply.⁸² A simple revision of the maximum was clearly no remedy; it is difficult to understand why the Weir Committee should have endeavoured to strengthen and render more effective the maximum price clauses of power companies by simply providing for more frequent revision of prices,⁸³ a suggestion actually adopted in the 1926 Act.

Local authority undertakings had no maximum prices and had been free to use any surplus for the reduction of rates. Schedule 5 of the 1926 Act provided that in future they would have to devote any net surplus to the reduction of charges, reduction of debts and expenses, and could not, after 1930, use it in aid of rates, unless the reserve fund amounts to more than 5 per cent. of the aggregate capital expenditure.

Compared with the crude simplicity of the maximum price system, the regulation by a *sliding-scale* of profits and dividends is more appropriate and effective, as the various classes of supply are distinguished, and positive encouragement is given for the reduction of charges by making it the condition for allowing higher dividends. Sliding-scales had regulated the profits of the power companies and formed part of the London Acts of 1925. The legislation of 1926 empowered the Electricity Commissioners to introduce similar clauses for any distribution company outside London which

⁸¹ H. N. Bunbury, *Econ. Regulation of Public Utility Services*, *Pub. Admin.* VI (1928), p. 212; H. Quigley, *Financial Times*, 19-1-26.

⁸² *El. Com. 7th Annual Report*, p. 17.

⁸³ Cf. *Weir Report*, s. 63.

received electricity from the Central Electricity Board either directly or indirectly, but apparently little use has been made of this right, except in the case of companies supplying over large areas, where a sliding-scale was introduced into the supply orders in accordance with Section 39 (2) of the Act.

The limited value of this method of control was discussed in a previous chapter. Here it may be further observed that, whilst it can be roughly effective in preventing exploitation of the consumer, it offers no inducement to a progressive sales and development policy where the demand is inelastic.

No modification of the details of price regulation is likely to improve matters in this respect, unless as a part of a far-reaching reorganisation by which a central planning body would impose definite quantitative tasks to local undertakers, and would base standard prices on a target development and costs, penalising any failure to reach this target and paying an efficiency bonus in the shape of extra dividends. It may, however, be doubted whether even as a part of such a broad scheme (assuming such a scheme could be fairly devised) it would be satisfactory to rely on increased dividends as the main incentive : the character of price control is essentially restrictive and not promotional.

Summing up, the present position of electricity supply is that of a sound and generally progressive industry hampered in its full development by causes that are largely the result of its historical growth. Some of these obstacles can easily be overcome, but others require measures which cannot be taken by the industry on its own ; they will need to be devised and supported by Parliament.

CHAPTER X

CONSIDERATIONS FOR THE REORGANISATION OF THE INDUSTRY

WHEN the Act of 1882 was placed upon the Statute Book, when electric lighting was an expensive luxury, when the limit of distribution was a few miles at most, when "transmission" as we now know it was undreamt of, it was natural to entrust the supply of electricity to authorities operating within parochial or municipal boundaries; and natural also, perhaps, considering the political atmosphere of the times, to provide that those authorities should be, ultimately at any rate, the elected representatives of the communities served. To-day, with "grid lines" covering the whole country and electricity regarded as an essential service for the whole community, the local authority is no longer necessarily the best instrument for the purpose. The old arrangements have to be reconsidered in the light of new technical, economic and social conditions.

There is little evidence that such a fundamental approach to the problem has been made in recent reform proposals; the question of electricity reorganisation has generally been examined with the object of patching up the existing structure as far as possible rather than of proposing bold measures.

It has become clear that the 1926 Act, with all its advantages, cannot alone solve the problem of the provision of an ample and economic supply throughout the country,¹ and that improvements in and co-ordination of distribution are necessary if the possibilities of electricity development are to be realised to the fullest possible extent.²

¹ H. Moore, Pres. Address, *I.M.E.A. Proc.* (1929), p. 17.

² Cf. El. Commissioners, *8th Annual Report* (1927-8), p. 5; *loc. cit.*, *12th Report* (1931-2), p. 7.

The 1926 Act has removed many obstacles and given encouragement to distributors who should have every incentive to work for an intensification of electricity consumption. If progress, even in this respect, falls short of what could be expected, the conclusion is not unreasonable that the legal and organisational framework of electricity distribution itself is not sound and has prevented a full development.

I. SUMMARY OF PROPOSALS

In response to a widespread demand for reorganisation, the Minister of Transport in 1935 appointed a committee under the chairmanship of Sir Harry (now Lord) McGowan "to bring under review the reorganisation of the distribution of supply in Great Britain; to advise on methods by which improvements can be effected with a view to ensuring and expediting the standardisation of systems, pressures and methods of charge, further extending facilities (including supplies in rural areas) and reducing costs" and the Committee submitted its recommendations in the following year.³

The report examined in detail the existing structure of the industry and came to the conclusion that the small size and multiplicity of authorities constituted in themselves the most serious obstacle to progress. It therefore called for a substantial reduction in the number of undertakings, the prevention of a further splitting up of distribution areas owing to the exercise of purchase rights by local authorities, and the elimination of duplicate supply powers in the same area.⁴ The Committee rejected the idea of a complete reorganisation on a regional basis under public control as resulting in a serious and unnecessary dislocation of the supply industry⁵; reorganisation should be effected through the absorption of surrounding undertakings by the existing efficient large bodies, or where this was not possible, by the creation of a public authority to take over and administer a number of undertakings.⁶

Shortly after the publication of the McGowan Report an anonymous body called "P.E.P." (Political and Economic Planning) published one in which it proposed legislation covering the

³ *M.O.T. Committee on Electricity Distribution (McGowan Committee) Report, 1936.*

⁴ *Loc. cit.*, par. 471.

⁵ *Loc. cit.*, par. 88 f.

⁶ *Ibid.*, par. 156.

appointment of a Committee to investigate the administrative and technical conditions of efficient distribution. On the strength of this investigation the Committee, it was urged, should determine the methods of remedying inefficiencies by reduction of areas, reorganisation by amalgamation and co-ordination. P.E.P. did not expect that, as a result, the structure of the industry would be substantially simplified or the number of undertakings reduced ; on the contrary, particular stress was laid on the disadvantage of too large areas. It was, therefore, envisaged that small independent undertakings might remain and with them some of the weaknesses of the present organisation. These were to be overcome by the creation of an electrical development authority which would finance research and subsidise if necessary the extension of supply to outlying districts, advance money for the standardisation of distribution systems and take over the purchase rights of local authorities. The authority might even act as a central purchasing agent for the whole supply industry. Their recommendations included an increase of power for the Electricity Commissioners and the removal of certain anomalies and restrictions of present legislation.

In April, 1937, the Ministry of Transport issued to interested parties a confidential "Outline of Proposals" on "Electricity Distribution" which, after the inevitable leakage, was later on published as a White Paper.⁷ It was generally based on the findings of the McGowan Report, but differed in certain details, such as the preparation of schemes. The McGowan proposal that schemes, when approved by the Commissioners, should become operative, even if they provided for the compulsory acquisition of undertakings with less than 10 million units,⁸ was rejected, possibly as a result of the protest by small undertakers. All compulsory schemes required a confirmation by the Minister of Transport and approval by Parliament.⁹

The amalgamation of undertakings was to proceed on one of three bases :—

- (a) Acquisition by one undertaker of the other undertakings in an area.
- (b) Transfer of all existing undertakings to a new distribution authority.

⁷ *Stationery Office Publication*, 1937.

⁸ *McGowan Report*, *loc. cit.*, par. 149.

⁹ *White Paper*, par. 14.

- (c) Transfer of the undertakings of local authorities to a Joint Board in accordance with Sec. 8 of the 1909 Act.¹⁰

Preference was to be given to Basis (a) as far as possible. An Appendix shows details of the proposed division of the country into 30 districts, sub-divided into groups which might be suitable as administrative units. These groups numbered 74, but many of them are again sub-divided into two or more sub-groups, frequently only consisting of one undertaking so that the number of administrative units anticipated amounts to 121, varying in size from a Metropolitan Borough of $2\frac{1}{2}$ square miles to whole counties of the size of Kent.

The intention obviously was to leave as many undertakers as possible untouched or to join them with others where harmonious co-operation might be expected rather than to create any comprehensive units with mixed urban and rural loads. Nevertheless, the White Paper, and especially the grouping proposals, were widely criticised and the I.M.E.A. lodged a strong protest against any idea of absorbing local authority undertakings by companies. Although electricity legislation was included as an item in the King's Speech for the 1938 Session, the Bill was never introduced owing to the increasing national pre-occupation with other problems.

In contrast to these schemes which are akin to the rationalisation proposals in other industries, such as cotton, iron and steel, in that they attempted to overcome inefficiencies by re-grouping and amalgamation, the Labour Party had from 1924 onwards demanded the complete nationalisation of electricity supply. A Report issued in 1932¹¹ called for the establishment of a national electricity board which should take over all authorised undertakings, the grid, railway and traction generation and replace the Commissioners and the C.E.B. This Board should be advised by a national consultative committee consisting of representatives of consumers, local authorities and labour. Local administration should be undertaken by regional boards under the control of the national board. A motion to this effect was tabled in Parliament in the 1936-7 Session. In July, 1943, a similar scheme was proposed by the Electric Power Engineers Association (E.P.E.A.). In 1944, the Labour Party re-affirmed its demand for the nationalisation of electricity supply as part of a more comprehensive national fuel policy.¹²

¹⁰ *Ibid.*, par. 7.

¹¹ Labour Party, *The Reorganisation of the Electricity Supply Industry* (1932).

¹² Coal and Power, *Report to Labour Party Conference* (1944).

Renewed interest in the reorganisation of the supply industry has been aroused during the war, as the reconstruction plans widely discussed depend for their success to some extent on a satisfactory and full electricity development. The Minister of Fuel and Power approached the Joint Committee of Electric Supply Associations, a body formed in December, 1939, for dealing with common war-time problems, with the request to submit recommendations. The Associations failed to agree upon a common approach to the questions to be considered. The greater number of them, however, appointed representatives to sit on an *ad hoc* committee formed to prepare a report. Its publication was, however, considerably delayed owing to the widespread divergence of views within the industry.

Meanwhile various bodies decided to prepare and submit to the Minister independent proposals. First, in March, 1943, the London and Home Counties Joint Electricity Authority made specific recommendations for the Greater London district, suggesting the formation of a small Board elected by local authorities and employees of the industry, to whom all existing undertakings should be transferred. In July of the same year the Electric Power Engineers' Association published its report on "Post-war Planning for the Electricity Supply Industry," to which reference has already been made. In November the Incorporated Association of Electric Power Companies (I.A.E.P.C.), after withdrawing from the Joint Committee, published a "Memorandum with regard to the Electricity Supply Industry in Great Britain" which proposed the creation of larger units by allowing power companies to absorb smaller undertakings, and demanded the extension of company franchise by at least another 50 years. Eventually, in January, 1944, the *ad hoc* committee appointed by the Joint Committee issued a Memorandum on electricity distribution with recommendations relating to future policy and practice (referred to in the following as "Joint Committee Memorandum"). It considered the need for certain reforms, but insisted on "Organised Co-operation" of the existing undertakers rather than any reorganisation as revolutionary as the McGowan Report. Advisory area committees were to be formed to assist in this co-operation and the only radical proposal was the suggestion to remove in effect the existing purchase rights of public authorities and to bar a transfer except under exceptional conditions. The scheme resembled in many details

closely the proposals of a committee of the I.M.E.A. made just prior to the war.¹³ At the same time, the I.M.E.A. issued an independent document in which it affirmed the principle of public ownership of distribution and demanded a transfer of generating stations to the Central Electricity Board. In view of this apparent contradiction of purpose an extraordinary meeting of the I.M.E.A. referred the joint memorandum back, whilst accepting the I.M.E.A. Memorandum. A later meeting adopted the proposals of the Joint Committee Memorandum with minor alterations.—The Association of Municipal Corporations passed a Report in September, 1944, in which it accepted the need for a comprehensive and compulsory reorganisation and urged the formation of larger units of distribution on the lines of the M.O.T. White Paper, 1937. Generation and distribution (if affirmed) should not be separated, but should be organised on an area, not a national basis.

The number of reports, recommendations and suggestions is impressive, but most of them are frankly *ex parte* statements which inevitably lack the breadth of vision of the three great reconstruction reports issued at the end of the last war by the Haldane, Williamson and Birchenough Committees.

II. REMEDIES FOR THE SHORTCOMINGS OF THE INDUSTRY

The extreme variety of reform proposals is evidence not only of a considerable divergence of opinion as to the means necessary for the achievement of given ends, but also of a disagreement regarding the very aims of reorganisation. Measures which may be quite suitable for increasing the efficiency of an undertaking suffering from lack of finance or enterprise, might easily be inadequate for rendering electricity a flexible instrument within the framework of a bold national planning policy. In addition, proposals may be technically satisfactory, but distasteful in their social or political implications to a large body of opinion.

Instead of discussing all the various proposals separately, an attempt will be made to establish what steps are necessary to overcome the shortcomings of the industry which have already been noted. After this the role of electricity within the framework of possible post-war reconstruction policies will be examined and the organisation necessary for the execution of such wider functions as

¹³ *Proc. I.M.E.A.* (1939), pp. 201 ff.

may be allocated to electricity supply. Finally, the administrative and political problems of reorganisation will be investigated.

(1) *Encouragement of Enterprise*

One of the reasons for the uneven development of electricity in this country was, as has been shown, the lack of effort and initiative on the part of some supply undertakings, which found expression in high prices and unwillingness to undertake development on bold lines in advance of demand.

Various legislative measures were designed to counteract any such tendency; for instance, the obligation imposed on undertakers to lay mains in certain parts of their areas within a prescribed period, the right of residents to demand a supply and the control of prices. It would involve no new principle if statutory provision was made obliging every electricity authority to undertake assisted wiring schemes and to give hire and hire-purchase facilities. Lack of effort is partly attributable to the absence of specialised staff and ignorance of modern selling methods. To remedy this, both the I.M.E.A. Committee in 1939 and the Joint Committee Memorandum, 1944, suggested the formation of Area Advisory Committees consisting of representatives appointed by the local undertakings. Their purpose would be to co-ordinate the development of electricity supply, to make recommendations to the Electricity Commissioners and to expedite the adoption of items of national policy. They were in particular to consider and make recommendations for improving service to consumers by some form of grouping of neighbouring undertakings, to stimulate the provision of reasonable service facilities by way of showrooms and the hire and hire-purchase of apparatus on uniform terms, to encourage the establishment of central repair and reconditioning depots and central purchasing agencies, to foster all types of sales development work and on request to arrange for the services of engineers and specialists.¹⁴

From the technical point of view, the measures suggested may be adequate in so far as the lack of effort is due to ignorance and unenterprise or to the limitation of resources, financial and otherwise. The usefulness of any such co-operative arrangement must be strictly limited as long as all the vital functions remain in the hands of the independent engineer or manager, who may be unwilling or

¹⁴ *Joint Committee Memorandum*, par. 50.

unable to benefit from the advice given. The experience of company combinations shows that there is a need for and considerable advantage in closer co-ordination, frequently leading from loose co-operation to eventual amalgamation.

It is more difficult to ensure that the financial conditions of supply are made sufficiently favourable to attract potential consumers.

The existing legislation gives what critics regard as an excessive protection to supply authorities against losses in supplying consumers whose premises are more than 50 yards from a distributing main. Undertakers can demand payment for the cost of services and demand a contract which guarantees them a return of not less than 20 per cent. on the capital outlay incurred in giving the supply, for a period of two years in the case of distribution companies¹⁵ and seven years in the case of power companies.¹⁶

The Weir Committee proposed the adoption of the American practice which imposed on an undertaker the obligation to give a supply in every case, subject only to his right of appeal against any unreasonable requests.¹⁷ Although the distances are considerably less in this country, and, therefore, the cost of providing supply should be smaller than in the U.S., this proposal was not accepted and the 1926 Act left potential consumers in outlying districts with the burden of a contractual obligation which was bound to act as a deterrent in many cases.

It is noteworthy that in one of the most successful rural development schemes, that of the Dumfries County Council, supply has been given to every consumer without any contribution to capital cost and without insisting on any guaranteed minimum revenue.¹⁸ The McGowan Committee, whilst objecting to financial conditions for connection in urban areas, considered some form of protection necessary for rural supply,¹⁹ but the White Paper on "Electricity Distribution" proposed that undertakers could be required to modify their conditions.²⁰

The measures necessary for achieving a complete rural electrification as part of a national agricultural policy will be discussed later, but it appears that even for a more moderate development—which

¹⁵ *El. Lighting (Clauses) Act*, 1899, s. 27.

¹⁶ *Cf. El. (Supply) Act*, 1922, s. 16 (c.)

¹⁷ *Weir Report*, s. 109 f.

¹⁸ *J.I.E.E.*, 82 (1938), p. 348.

¹⁹ *Loc. cit.*, par. 400 ff.

²⁰ *Loc. cit.*, par. 22 v.

should become self-supporting and profitable within a reasonable period—persuasion alone may be insufficient and must either be accompanied by financial inducement or backed by compulsion. The first alternative might mean a subsidy to the extent of any losses that may be made in the first few years of active development, but unless the subsidy has a definite time limit it might be harmful in encouraging inefficiency and waste. Compulsion might consist of an instruction by a central authority, such as the Electricity Commissioners, to carry out certain work and to reduce charges to a certain figure, otherwise the undertaking to be absorbed by and into a more efficient unit. This proposal might give each undertaking a chance to prove its efficiency, failing which a more thorough reorganisation could no longer be opposed.

(2) Standardisation of Technical and Financial Methods

The disadvantages under this heading are mainly the absence of standard systems of low voltage supply and of uniform methods of charge which are not so much factors reducing the efficiency of supply undertakings as obstacles to a widespread and intensive adoption of electricity by the public.

(a) Standardisation of Systems and Voltages

As we assume the exclusive use of alternating current for domestic purposes is both in the interest of the community and of the individual supply undertaking, it would not constitute a hardship if the change-over within a limited period was made compulsory. During the 11 years from 1926-7 to 1937-8, the number of authorities supplying either d.c. alone or at least partly d.c. fell from 418 to 296, an indication that the progress by voluntary means may have been steady, but was certainly not speedy, and that compulsory measures may be necessary if the growing inconvenience of manufacturing equipment for two types of current is to be overcome.

The situation with regard to standardisation of voltages is not so simple, as a change-over to 230 V means little, if any, advantage to the supply authorities, but on the contrary involves considerable expense. The progress made, as we have seen, was highly praiseworthy, but it may be questioned whether it justifies the hope that full standardisation can be achieved by purely voluntary means. Large undertakings which have carried out considerable development work at standard voltage may find it advisable and economical

to change over their non-standard nucleus,²¹ but many, especially small undertakings, are probably both unwilling and unable to bear the high costs involved. Compulsory legislation is recommended both by the Report of the I.E.E. Post-war Planning Committee and the Joint Committee Memorandum.

Should the individual undertaking bear the financial burden? The main benefits of standardisation are shared by the consumers in the country as a whole and it would, therefore, appear fair to make the whole industry bear the cost, if it was not for the fact that a number of undertakers have already carried out the standardisation at their own expense. For this reason and in view of the levy imposed at the time for standardisation of frequencies, the McGowan Committee did not recommend the imposition of such a further burden,²² but they realised that without some such step immediate standardisation would be impracticable. They reached the conclusion that the only satisfactory way of achieving the desired result was as part of a more far-reaching reorganisation of the industry, leading to the creation of larger units. The Joint Committee Memorandum also rejected the idea of a levy on the industry, but suggested that, where necessary, the money for standardisation should be advanced to the undertaking by the Government at low rates of interest. Undertakings could probably find the money for the repayment and interest with little difficulty, because of the economies and accelerated progress which the Committee anticipated as a result of standardisation.

In the general controversy about reorganisation many voices have been heard recently urging at least standardisation of voltage as an immediate step, irrespective of the other unsolved problems, possibly with partial compensation out of national funds.²³ Whilst this is certainly a step in the right direction, it may be considered that small independent undertakings are not likely to be the best and cheapest agents for the replacement of meters, appliances, etc., and that all this could be carried out more easily as part of a general scheme of rationalisation of the industry.

(b) Uniform Methods of Charge

There is probably general agreement that the variety of tariffs used by undertakers is undesirable and that the adoption of one or

²¹ Cf. Pres. Add., *I.M.E.A. Proc.* (1939), p. 23.

²² *Loc. cit.*, par. 320-1.

²³ J. R. Beard, *J.I.E.E.*, 88 I (1941), p. 29; *El. Review*, 132 (1943), p. 573.

perhaps two standard methods of charge throughout the country would substantially contribute to popularising electricity service. Legislation has been recommended empowering the controlling Minister to require all authorised distributors to offer an approved two-part tariff as an alternative to a flat rate,²⁴ or even as the only method, subject to certain guarantees, so that no consumer is forced to pay an excessive price for electricity.²⁵ Whether the appointment of another special committee to advise the Electricity Commissioners on the form of a compulsory tariff, as recommended by the Joint Committee Memorandum,²⁶ will lead to more conclusive results than the previous two Committees sitting on the subject, may perhaps be doubted unless the Committee is definitely instructed to determine a workable method which can be enforced in spite of any small disadvantage it may have.

To bring about a unification of tariff methods in an otherwise unchanged industry is, however, likely to meet with opposition from managements satisfied that their own particular tariff structure is more suitable for their own area, and from consumers who may find the new rates less favourable to them. The immediate effect of such a step might, therefore, not be an increase in the use of electricity, and results may be disappointing unless the measure is accompanied by other steps to develop the use of electric power. These are the reasons why the McGowan Committee suggested that the reorganisation of the industry into a smaller number of larger units must be an important first step towards securing greater uniformity of methods of charge.²⁷

To reap the full benefit from a unification of methods of charge, it must be accompanied by greater uniformity of tariff rates, for the gross inequality of prices, whether justified by actual costs or not, is one of the most serious complaints against the present system. A demand for complete uniformity cannot be satisfied without a major re-organisation and will be discussed later on, but there are certain measures within the framework of the existing structure of the industry which can be taken to ensure an improvement in the present situation. *Most important of these would be the introduction of a single grid tariff for all distributors and the abolition of all special*

²⁴ *McGowan Report*, par. 332.

²⁵ *I.E.E. Post-war Planning Report* (1944), p. 19.

²⁶ *Loc. cit.*, par. 29 f.

²⁷ *Loc. cit.*, par. 331.

preferential prices for the owners of selected or non-selected stations. This would at least standardise one cost item, which is at the root of a lot of the tariff trouble.

A stricter control over prices would be desirable, but the difficulties of making the existing maximum prices and sliding-scale controls more effective have already been mentioned. One method which might be successful would be the fixing by law of maximum unit rates on the compulsory two-part tariff, leaving only the fixed component to cover the difference in distribution costs and capital charges. This suggestion was made by J. A. Sumner,²⁸ but he raised the question as to whether it can be adopted without further reorganisation of the industry. Obviously, the fixed charge must be reasonably low if it is not to have deterrent effects on consumption, and Sumner points out that for undertakers with annual sales of less than 10 million units the offer of low prices would result in at least temporary loss, which they can ill afford to bear.²⁹

A complete control of charges as exercised by the Electricity Commissioners over the Joint Electricity Authorities would be difficult to apply in the case of undertakings authorised to make certain profits. The safeguards to existing interests, which would be politically necessary, would probably complicate the control to such an extent as to render it practically ineffective.

(3) Gaining the Advantages of Large Size

Unsatisfactory progress of electrical development has frequently been due not so much to any fault of the supply authority concerned, but to the disadvantage of unsuitable areas of supply, both technical and administrative. These disabilities can be overcome either by the organisation of suitable assistance to backward undertakings or by the creation of larger authorities through some form of amalgamation.

(a) External Assistance to Independent Undertakings

Lack of resources and the difficulty of obtaining capital may seriously cramp development in a small undertaking, and it is here that outside help can relatively easily be given. Local authorities have always been able to raise loans at low rates of interest on the security of the rates, but companies have had no corresponding

²⁸ *J.I.E.E.*, 81 (1937), p. 454.

²⁹ *Ibid.*, p. 459.

facilities. Furthermore, certain extensions and developments, although likely to be remunerative in the long run, if actively undertaken, may involve the certainty of loss for considerable periods which would be beyond the resources of small undertakings if left unaided. These problems could be solved by the creation of a suitable authority with powers to grant loans at low rates of interest, to guarantee a minimum revenue for a certain period or even to give outright subsidies. In the P.E.P. Report such a task is allotted to an electrical development authority,³⁰ and the Joint Committee Memorandum suggests that area committees should make suitable recommendations to the Electricity Commissioners.³¹

Who should pay for such subsidies? The answer depends on who, apart from the immediate beneficiaries, is likely to derive any advantage from electricity development in a particular area? Is it the electricity undertakers in the immediate neighbourhood; is it the supply industry in the country as a whole? Or is it rather the whole community which becomes wealthier through the improved conditions of production and greater amenities in the newly-developed districts? The decision also depends on considerations of what constitutes the most effective control over the proper use of subsidies as recommended by the Joint Committee Memorandum. An area committee is likely to keep a closer watch over the efficiency of any subsidised undertaking if its constituent members have to bear the burden in the shape of a regional levy on the supply industry than if all supply authorities in the country share the responsibility or the Government pays the bill. On the other hand, it may be inclined to allow an excessively slow rate of development in order to reduce its financial commitments.

Another weakness of small undertakings is their general inability to secure the best managerial and commercial staff, and the necessity for personnel to embark on a variety of different duties where it would be economical in a large undertaking to employ separate specialists. This is a problem common to all industries and can at least partly be solved by co-operative means. Various undertakings could jointly engage experts on development and advertising or, alternatively, outside bodies like the E.D.A. could undertake the education of the public and carry out appropriate propaganda, just as advertising firms conduct selling campaigns for other industries.

³⁰ *Loc. cit.*, par. 102.

³¹ *Loc. cit.*, par. 30 f.

Holding companies have adopted some of these ideas for their own groups, but it is frequently found that their control extends to central purchasing and management which would, of course, not be possible in the case of independent authorities. Some of the specific proposals made by the Joint Committee for "organised co-operation" have already been indicated.

No assistance can overcome the disadvantage inherent in the delimitation of supply areas according to local boundaries instead of conforming to technical needs. Extreme cases, it is true, can be dealt with by fringe order procedure, and minor adjustments of boundaries have been and can be brought about by mutual agreement or at the instruction of the Electricity Commissioners, possibly advised by some area committee.³² However, the benefits of comprehensive planning of transmission and distribution systems, of diversity of load, etc., can only be reaped by the amalgamation in some form of hitherto independent undertakings.

(b) *Amalgamation*

The formation of larger units of supply has been demanded by most unbiased observers of the industry as an essential condition of greater efficiency, and forms the major part of the McGowan recommendations. The Cooper Report on Hydro Electric Development in Scotland³³ reached the same conclusion and has led to the constitution of the Hydro Electric Board for Northern Scotland. Even the Joint Committee Memorandum mentioned as one of the functions of the proposed area committees that they should consider and make recommendations for improving the service to consumers by some form of grouping of neighbouring undertakings.

The advantages of size are not automatic and can only be realised with efficient staff and management anxious to utilise the opportunities of large-scale enterprise. It may be that the Joint Committee Memorandum wanted to draw attention to this fact when it stated that a drastic reduction in the number of authorised undertakers will not "necessarily" result in lower prices or a more efficient service to consumers.³⁴

It will be appreciated that with the amalgamation of undertakings into larger units, the solution of other problems would be facilitated.

³² *McGowan Report*, par. 24; *Jt. Com. Memorandum*, par. 50 (c).

³³ Cmd. 6406 (1942).

³⁴ *Loc. cit.*, par. 46 (g).

The variety of systems and pressures of supply and the inconsistency of rates of charge impede efficient development. The authorities controlling the amalgamated units would have a direct inducement to bring about uniformity without the need for outside financial help.

If the desirability of creating larger units is accepted, the question arises how they are to be formed out of the existing structure of the industry. Legislation from 1909 onward had granted facilities for voluntary co-ordination, first of local authority undertakings and, later on, of companies (although short of complete amalgamation.) The main idea of the 1919 Act had been to allow undertakings to work together in joint electricity authorities, but all these proposals had failed partly due to the understandable fact that combination would not necessarily be an immediate advantage to all parties, and partly for political reasons, such as antagonism between private and public enterprise and parochial pride in local independence. These obstacles still remain and would appear to render it unwise to place hopes in the possibility of any comprehensive reorganisation on a voluntary basis.

The constitution of larger units, the question of ownership and control is primarily of a political nature and will, therefore, be discussed at a later stage. At present the technical conditions of success are under consideration. From this angle there is one major point which must influence all decisions: whatever organisation is adopted, it should ensure that a broad approach is made to the problems and that the interests of the whole area are safeguarded. For example, although a combination of rural and urban areas is highly desirable, it would be inadvisable to achieve this by simply absorbing outlying districts into the urban undertaking, which may be without any technical qualifications to carry out specialised rural development work. The I.E.E. Post-war Planning Committee, 1944, referred to the slow development which was evident where areas of supply comprise both well-built urban and rural portions.³⁵ Should, therefore, this solution be adopted, some form of central or regional control would appear to be essential to enforce a progressive development and tariff policy.

(4) Prevention of Further Disintegration

If the case for increasing the size of undertakings in the electric supply industry is strong, the arguments against allowing any

³⁵ *Loc. cit.*, p. 11.

further disintegration of units are overwhelming. The McGowan Committee established that before 1946 100 company-owned undertakings will be due to be purchased by local authorities, and if all the rights are exercised they would be split up into 344 separate undertakings.³⁶ Facilities for the temporary postponement of purchase dates for a period not exceeding three years for any one application have as a war-time measure been given by a special Act. Now that the war is over this problem becomes one of great urgency.

It cannot be taken for granted that the existing undertakings constitute the most efficient units of supply or that their development policy has always been progressive. Moreover, the threat of purchase may, in many cases, have acted as a brake on capital investment and initiative. A further postponement of the purchase date would extend the period of uncertainty and would thus be against the interest of the area concerned. The I.M.E.A. in its confidential Memorandum on the ownership of distribution undertakings and generating stations, 1944, recommended that the purchase should be effected at one and the same time by one authority, if necessary by the postponement of some purchase dates until the maturing date of a neighbouring undertaking, a policy already adopted by the London and Home Counties J.E.A. In order to eliminate dual rights of supply, power company rights and assets should also be purchased and transferred. On the other hand, the Joint Committee Memorandum recommended in effect the complete repeal of all purchase rights.

The policy to be adopted will be largely determined by wider political considerations, but from the technical point of view two demands should be fulfilled.

1. That the cutting up of areas should generally be prevented and should only be permissible, with the approval of the Electricity Commissioners, in exceptional cases, where it would be in the interest of development, without prejudice to future organisation. It follows, however, that if local authorities are prepared to form Joint Boards under the 1909 Act to take over the supply areas as a whole, no objection should be raised except the condition that any wider measure should have over-riding force, just as the 1926 Act rendered parts of the 1925 London Acts obsolete.

³⁶ *McGowan Report, loc. cit.*, par. 71.

2. That, in as far as existing companies retain control, they should be encouraged to undertake development work by reasonable guarantees of recompense for capital expended.

III. CONSIDERATIONS OF NATIONAL PLANNING POLICY

The question of reorganisation has so far been discussed from the angle of overcoming the weaknesses existing in the electricity supply industry and of increasing its overall efficiency. A considerable degree of success can be achieved without radical change, assuming goodwill on all sides, but it may involve complicated financial adjustments and subsidies. The full economies of large-scale enterprise can only be obtained by some form of amalgamation of undertakings, especially of rural with urban districts. The adoption of such a measure would also facilitate the standardisation of technical and financial practice.

There is, however, another approach to the problem, due to the special, perhaps unique, position of electricity in modern society. It is not a commodity like many others, but provides the most comprehensive and flexible energy transmission service within the framework of modern civilisation. It is equally useful for lighting, heating and cooking in the home, for power in shop and factory, for pumping water and rendering wireless and cinema accessible to the remotest village. The availability of such a service is obviously of the greatest importance for many activities and for the well-being of the people. It forms an essential condition of success for any scheme of national planning which involves the fostering of industries or the development of new centres of production.

National planning is not a novel idea for converting a free society into a bureaucrat's paradise ; it is as old as the idea of the " State " itself. With its inception, " the State " takes charge of certain functions and duties which it is felt cannot safely be left to the discretion of lesser interests. In the Mercantile age the State's economic activities were extensive, but they had a restrictive effect on new industrial enterprise, and the Industrial Revolution, therefore, demanded and secured a policy of *laissez faire*. For reasons indicated in the introduction of this book, the assumptions of the Liberal Age that the result of independent individual efforts to make the maximum profit would lead to the highest national advantage, has ceased to be universally true under the complex conditions of to-day. In a world in which whole industries, indeed

whole countries, can become bankrupt through no fault of their own, simply as the result of the instability of some other industry, the policy of a foreign country, or of the impersonal forces of the trade cycle, the dogma of full individual responsibility for one's own fortune and of State indifference in business matters must necessarily break down.

If the recurrence of severe depressions with large-scale unemployment is to be prevented ; if the hopes for social security in a well-balanced society are to be fulfilled, conscientious central planning involving direct handling of some activities and positive direction and control of others, will be necessary. Amongst the subjects popular in present-day discussion may be mentioned policies designed to stabilise investment, to plan the location of industries and to secure a strong and self-supporting agriculture and rural industry. Certain steps will have to be taken by the State, but the success of the policy will depend on the agreement of a large number of individuals and firms. Compulsion, although it may be necessary in certain respects, cannot secure willing co-operation, and a free society will not, in normal times, accept irksome restrictions : freedom of movement may be limited to the extent that some areas are barred for certain purposes and that new industries may only be established in development areas, but employers and workers would resent any compulsion to settle in a prescribed locality. They must be persuaded, maybe by appeals to their patriotism, but any such proposal must fail in the long run unless persuasion is accompanied by the provision of good working and living amenities. It is here that the specific role of electricity acquires a new importance. It may be necessary to arrange for electricity supply to provide services, not in response to any existing demand, but in advance of the consumer. Supply policy, to be effective, may have to be guided not by ordinary business considerations, but by the wider aims of national economic policy. Can this be carried out within the framework of the present organisation ?

(1) Planned Industrial and Agricultural Development

The growing congestion of large towns, the haphazard sprawling of suburbs into the countryside, chronic unemployment in depressed areas, these were symptoms of maladjustment in the inter-war period which called for State action. A Royal Commission on the Distribution of the Industrial Population reported on the question

of the future location of industries in 1940³⁷ and drew attention to the heavy expenditure by the community for the provision of the necessary facilities, such as new roads, housing, public utilities, transport, etc., caused by the centrifugal movement of industries, and to the waste which might be caused in the absence of a consistent plan. It recommended the appointment of a national industrial Board for the consideration and encouragement of decentralisation in the form of garden cities, satellite towns, trading estates and by the development of existing small towns. In the case of London, which was considered an urgent problem demanding immediate action, the Board should have power to regulate the establishment of additional industrial undertakings. The powers thus demanded were criticised as insufficient by the minority report; in any case, the success of a policy of encouragement of industries in certain districts, even if coupled with wider powers of prohibiting the establishment in other localities, depended on the creation of favourable conditions for employers and workers.

The White Paper on Employment Policy published in 1944 proposed that the Government should be granted power to prohibit the establishment of factories in certain districts and to steer new factory development into certain areas by giving priority for construction, financial assistance and taking the necessary action for the full development of basic services, such as transport, power, improvement of housing, etc.³⁸ Sir William Beveridge considers an effective control over the location of industries as indispensable for the attack on mass unemployment.³⁹

Suitable workshops and houses, transport and power, social services and amenities are all essential and electricity plays a prominent part.⁴⁰ The first Interim Report of the Welsh Reconstruction Advisory Council⁴¹ enumerates four major facilities which are considered essential for retaining and attracting the modern industrialist, one of which is cheap electric power.

In 1942, the Committee on Land Utilisation in rural areas under the chairmanship of Lord Justice Scott issued its report,⁴² and

³⁷ *Barlow Report*, Cmd. 6153 (1940).

³⁸ Cmd. 6527 (1944), par. 26 f.

³⁹ *Full Employment in a Free Society* (1944), par. 228.

⁴⁰ Cf. Sir John Snell, *Min. Evid. Royal Comm. on the Geographical Distribution of the Industrial Population* (1937).

⁴¹ *Ministry of Reconstruction Publication*, H.M. Stationery Office (1944).

⁴² *Scott Report*, Cmd. 6378 (1942).

recommended a more positive policy of rural development. The Committee recognised that the formulation of a national plan will touch on many spheres such as industry, labour, agriculture, housing and public utilities, and that the various types and units of development have to be co-ordinated and regulated by a suitable machinery, if the best use of the country is to be attained.⁴³ For this purpose a Central Planning Commission was proposed. The execution of the plan was to be left to the larger local authorities, namely County Councils or County Boroughs with their surrounding rural areas.⁴⁴ In exceptional cases the policy of the proposed Minister of National Planning might require executive action by special national bodies. If a healthy British agriculture is to be maintained and fostered, a further mechanisation and concentration on special kinds, such as dairy farming, will have to take place. At the same time, the standard of living of the farm workers will have to be substantially raised by better housing, amenities and social services. Again electricity plays a major role.

If comprehensive State action is taken, will it be satisfactory to leave the electricity undertakings independent, and to all intents and purposes exempt from planning control ? An electrical development based on the principle of all-round efficiency, even with prices closely related to costs, may fail in its particular function of assisting in a scheme which consistently sets aside commercial considerations and attempts to modify the economic conditions in the country for the sake of greater stability and healthier growth.

The specific problem which certain national planning policies may raise is that the electrical development policy required for their execution is not identical with the interests of the local undertakings in control of electricity supply. The divergence is likely to be primarily of a financial character, but other considerations also play an important part.

If rural electrification is decided upon, the conditions of success are a bold and comprehensive development policy and low charges irrespective of the actual costs involved ; if for the purpose of creating stable employment in depressed areas special types of industries are to be encouraged, electricity may have to be supplied at very low rates, possibly at a loss ; if in the pursuit of a healthy town-planning scheme people are to be encouraged to migrate

⁴³ *Loc. cit.*, par. 217.

⁴⁴ *Ibid.*, par. 221-3.

away from large cities to small towns, the change must be made attractive by providing better amenities in the new area than in the old one ; it is conceivable that well-built houses with labour-saving appliances will form a very real inducement which may have to be reinforced by the prohibition of new building or extension of services on the outskirts of large centres of population.

The following problems have to be solved :—

1. Who should bear the burden of any subsidies and what form of subsidy is most desirable ?
2. How to ensure the greatest efficiency of supply where it is most important, if necessary leading to the neglect of some districts in favour of others, although the latter may be less attractive from the commercial point of view.
3. Whether compensation is due to undertakings whose consumers and expectation of future expansion are reduced as a result of a re-location policy.

Many electrical development schemes have been started with a loss which undertakings are prepared to bear in the virtual certainty of later re-imbursement. It would, therefore, be unnecessary and, indeed, undesirable to grant financial assistance where losses are likely to be only temporary and where they will act as a spur to intensive development, beyond enabling a weak authority to carry out the necessary work. If, for instance, undertakers were to be prohibited from demanding a guaranteed revenue before giving a supply in rural areas, no compensation would appear to be necessary except, perhaps, in exceptional cases. On the other hand, an instruction to supply electricity at specific rates or to isolated premises may mean a considerable loss which the electricity authority concerned cannot be expected to bear indefinitely. In such a case a subsidy will be necessary, financed either in the shape of some contribution from outside or by an increase of charges to other consumers. The former alternative appears to be preferable on general grounds, for, if the nation decides on a certain course of action, it should also bear the financial consequences. A Treasury grant in aid of unprofitable development could be given in the form of a lump sum contribution to the capital cost, which would not destroy the inducement of the undertaking to increase its own revenue by efficiency and progressiveness. In view, however, of the difficulty of carrying out close efficiency control without a complicated bureaucratic machinery, it has been suggested that local

authorities should be made responsible for control and subsidy.⁴⁶ The proposal suffers from the disadvantage of making the consumer pay as a ratepayer what he is considered incapable of paying as a user of electricity.

The other method of internal subsidy has been adopted in the frequent subsidisation of rural development at the expense of the urban consumers of an undertaking, but cannot, as the Joint Committee Memorandum points out, be indefinitely extended within the present structure of the industry.⁴⁶ Small towns surrounded by country districts are probably incapable of supporting a large-scale development scheme. On the other hand, if the country is taken as a whole, an increase in the average receipts from domestic supplies of as little as one-tenth of a penny would suffice to meet the capital charge on a capital contribution to rural electricity development of £55 million.⁴⁷ This contribution could be obtained by means of a levy on the industry in the same way as the standardisation of frequencies was financed. In special cases the C.E.B. is enabled under Clause 2 of the 1935 Act to supply electricity to undertakers at special rates for the purpose of assisting special industries, which is a veiled subsidy at the expense of the undertakings paying full grid tariff. As it is clearly desirable to spread the burden of any subsidy as widely as possible, theoretically at least the Treasury grant appears to be the most equitable solution. A decision on this question must, however, be postponed until later.

Any subsidy, by bridging the gap between costs and revenue, removes, or at least diminishes, the inducement to reduce costs by greater efficiency. If in the national interest a subsidisation of certain electrical development is decided upon, steps will have to be taken to ensure that the most economical use is made of the grant so that it will secure the widest benefit. In view of the complicated cost conditions in the industry, such control would have to be detailed and comprehensive. Is it safe to assume that the existing local undertakings are fully capable of carrying out development work in the most economic and efficient way?

There is good reason to expect that a considerable proportion of small and inefficient undertakings will be found in the electrically

⁴⁶ Cf. *McGowan Report*, par. 412.

⁴⁶ *Ibid.*, par. 42.

⁴⁷ Cf. London and Home Counties J.E.A., *Observations on Joint Committee Memorandum* (1944).

backward areas, which will need development most urgently. Lack of means, as has been shown, is only one of the reasons for their past failure ; inadequate staff will not be transformed into first-class experts simply by the grant of a subsidy. Advisory committees, supervisory control, even if combined with the threat of more radical action, would not be sufficient for the purpose of the national plan in which so much depends on the proper timing of efforts. Delay in providing a satisfactory electricity supply may seriously endanger the whole scheme.

Many company undertakings with rural areas are controlled by large holding companies which may be trusted to provide adequate personnel and the skilled services of specialists when altered conditions appear to warrant greater attention. This is one of the advantages of this type of control, which has been fully appreciated by the McGowan Committee.⁴⁸ However, the potentialities of abuse and the possibilities of charges for electricity being maintained at an unnecessarily high level induced the Committee to doubt whether this structure is satisfactory in the long run. It would be politically difficult to grant vast subsidies to undertakings which are in no real sense subject to public control.

Next to efficiency, an appreciation and acceptance of the national plan is of great importance. This may be put to a severe test should it become necessary to press unprofitable development, possibly at the expense of commercially attractive schemes. Immediately after the war, in view of the persistence of shortages in labour and materials, it will be important to give priority to the requirements of financially weak consumers, such as, for instance, rural cottages, at the expense of financially strong demands, such as public houses and cinemas. As long as war-time controls remain, they will ensure the best use of available resources, but similar problems may arise later on when the restrictive machinery of controls does not exist any longer. Can existing undertakings carry out such a policy ? The principle and justification of private enterprise is that the desire to maximise profits will encourage initiative and progress, and that competition will safeguard the interests of the consumer in forcing prices down. In electricity supply, competition is absent for certain essential services, although the condition of falling costs with increasing sales encourages a policy of cheap supply. A supply company will naturally want to concentrate on the most profitable

⁴⁸ *Loc. cit.*, par. 287.

development. If, however, the policy is to be directed from outside, if considerations of profit must not be the test of action, then the primary motive of private enterprise is taken away and it may be better to submit the industry unambiguously to public ownership and control. "In private ownership," as Lord Reith pointed out, "there is often a high ideal of public service, but the first obligation is to shareholders, and those two obligations are incompatible."⁴⁹

A municipal undertaking is not designed to make a profit for shareholders, and in so far as the aims of national policy coincide with local interests, no conflict will arise. It is certain, however, that this cannot always be the case, as, for instance, concentration on rural development may involve a short-run sacrifice by the urban consumer. Progressive towns have frequently introduced electricity into the surrounding districts at a loss to themselves, but, in general, it seems too much to expect a municipal authority to devote its resources to the development of outside districts (and thereby to attract buildings and factories away from its own boundaries), even if an actual financial loss should be borne by a national fund. The local authority would be assisting in a measure which, however desirable from the national point of view, might entail loss of rates and of capital invested in roads, social services, schools, etc., which would become superfluous. In the case of electricity supply, it would mean the loss of secure loads for mains, substations, etc., upon which capital has been irrevocably expended, for the sake of a supply requiring considerable fresh capital investment which may hardly be covered by revenue.

The discussion during the passage of the Town and Country Planning Act, 1944, showed that this problem arises in many spheres of local government and appears to be practically insoluble without a far-reaching reform of the present system. It has been suggested as a condition of success that regional government authorities should be formed, with financial powers sufficient to recover out of the gains of the country the taxable capacity lost by the towns,⁵⁰ but there are no immediate prospects of such a reform. The larger the supply undertaking, the less will be the relative importance of the financial burden caused by the loss of certain consumers or the accretion of commercially unattractive loads.

⁴⁹ *Parl. Deb.*, H.L., Vol. 123 (1942), c. 420.

⁵⁰ *Economist*, 7-10-44, p. 468.

In conclusion, it may be said that any national policy of planned industrial and agricultural development would reinforce the need for large units of electricity supply, but would require guarantees that the electrical side of the planning would be carried out without delay and in accordance with the wider plan, irrespective of commercial considerations. This implies such restrictions on the scope of private enterprise that only a public authority would be appropriate for the execution of the scheme.

(2) *Planning for Full Employment*

One of the post-war aims accepted by all parties and entering into all post-war considerations is the determination that the tragic waste of large-scale unemployment must be prevented and that it will be the function and responsibility of the State to take all steps necessary to ensure full employment.

Whatever else such a policy may involve (and Lord Keynes believes that a comprehensive socialisation of investment will prove the only means of securing an approximation to full employment),⁵¹ it is agreed that the market mechanism is unable to secure a steady flow of private investment and that public investment must play a vital part as a stabilising factor. The White Paper on Employment Policy considered measures to combat unemployment caused by trade cycle conditions rather than the attainment of full employment. It recommended the preparation of public schemes, to be set in motion immediately private investment shows signs of slackening.⁵² Although the purpose of State policy is thus limited, the White Paper realises the difficulty of the central Government compelling local authorities and public utility undertakings into a substantial acceleration of their capital programmes "without much more power of direction than they now possess." Within these limits of policy "the Government believe that they can influence public capital expenditure to an extent which will be of material value for the purpose of maintaining employment."⁵³

Sir William Beveridge, on the other hand, expresses the view that "full employment cannot be attained simply by efforts to stabilise the trade cycle by revised financial budgetary methods for dealing with private investment, reinforced by public investment . . ."⁵⁴

⁵¹ J. M. Keynes, *General Theory of Employment, Interest and Money* (1936), p. 378.

⁵² Cmd. 6527 (1944), par. 41.

⁵³ *Ibid.*, par. 62.

⁵⁴ *Full Employment in a Free Society*, par. 250.

The idea of keeping communal (public) investment on tap was practicable only for a very small fraction of communal investment and public business investment, as the demand for these types of investment is intimately linked with the general economic activity of the nation.⁵⁵

In the electricity supply industry two kinds of investment may be distinguished, namely extension of services to ultimate consumers, which cannot be deferred, and long-term investments, such as the construction of generating plant, the change-over of equipment and appliances for the purpose of standardisation and the comprehensive electrification of undeveloped areas, which can be timed to assist a public investment policy.

The construction of electrical plant and equipment affects employment over a wide field in the engineering industry; it has been estimated, for instance, that between 60 per cent. and 65 per cent. of any money expended on electrical equipment goes to about 50 different industries.⁵⁶ The stimulating effect of investment in electricity supply will, therefore, be felt especially in those industries which suffer most from a decline in private industrial investment.⁵⁷

The usefulness of electricity for the purpose of trade cycle control has been stressed in many reform proposals, and some of the Acts of Parliament designed to relieve unemployment during the inter-war years have given special encouragement to electrical development. The Trades Facilities Acts, 1921-6 enabled the Treasury to guarantee loans for capital undertakings calculated to promote employment and the Development (Loan Guarantees and Grants) Act of 1929 empowered the Ministry of Labour to make grants to local authorities for suitable works at the recommendation of the Unemployment Grants Committee with Treasury approval. Furthermore, the Treasury could, after consultation with the Development (Public Utilities) Advisory Committee, guarantee loans and make grants for the purpose of assisting other bodies carrying on public utility undertakings.

The Unemployment Grants Committee was able to support a large number of electrical schemes until in 1925, with a change of Government, the policy was modified. Only work was eligible

⁵⁵ *Ibid.*, par. 254.

⁵⁶ Lord Hirst, *Financial News*, *El. Supp.*, 25-3-35, p. 19.

⁵⁷ Cf. Bretherton, Burchardt and Rutherford, *Public Investment and the Trade Cycle in Great Britain* (1941), p. 146.

which would not otherwise have been undertaken for a considerable period, i.e. more than five years, and the unemployment sought to be removed had to be exceptional.

In view of the continuous growth of the industry, it was considered unlikely by the Electricity Commissioners that many schemes would be approved under the new conditions.⁵⁸ Applications for guarantees under the Trades Facilities Acts continued until 1927, when the Acts were allowed to lapse.

With the change of Government in 1929, and especially after the onset of the Great Depression, applications for grants were again encouraged and the Electricity Commissioners in November, 1929, urged all authorised undertakers to expedite programmes of development wherever practicable. They drew attention to certain classes of work suitable to be undertaken in anticipation of general development, such as completion of urban distribution networks and the extension of wiring to cater for power loads, change-over to alternating current, etc.⁵⁹

The conditions for unemployment grants were considerably relaxed, with the result that applications from local authorities rose from 6 in 1929, with a proposed expenditure of about £50,000, to 112 in 1930, amounting to £3,650,000.⁶⁰ The C.E.B. applied for financial assistance for carrying out the South Scotland and North-East England electricity schemes, including the standardisation of frequency, with an estimated expenditure of £10 million. The Government made a grant under the Development (Loan Guarantees and Grants) Act, 1929, towards the interest payable by the Central Board on the sum expended.⁶¹ The reception by the industry of the appeal cannot be accurately measured, as applications for financial assistance were not made in every case, but the results of the appeal were considered inadequate. The Prime Minister presided over a conference of local authorities in June, 1930, in which he impressed on them the need for further large-scale public works in relief of unemployment, and amongst other Ministers the Minister of Transport held local conferences with representatives of the supply industry in which he urged speedy development.⁶²

⁵⁸ *El. Com. 6th Report* (1925-6), p. 50 f.

⁵⁹ *Loc. cit.*, 10th Report (1929-30), p. 74.

⁶⁰ *Ibid.*, 11th Report (1930-1), p. 65.

⁶¹ *Loc. cit.*, 10th Report, p. 75.

⁶² *Loc. cit.*, 11th Report, p. 64.

The Public Works Facilities Act, 1930, had the specific object of expediting the procedure for empowering undertakers to carry out works and to minimise delay in acquiring land and way-leaves. The urgency of speedy action was stressed by the announcement of the Unemployment Grants Committee in March, 1931, that they would consider schemes submitted up to June 30th of that year, if they could be actually commenced by October 31st. In September, 1931, the crisis had broken out and the National Government reversed the policy of grants and decided on a drastic reduction of their amounts.⁶³ The attempt to overcome the financial crisis by strict economy led to a restrictive financial policy which caused the deferment of many schemes.

Altogether, the Unemployment Grants Committee approved electricity development schemes involving a capital expenditure of £24.5 million. The amount of the Government grant to electricity was 12.8 per cent. of the total State contribution towards public works, and was only exceeded by the aid for sewage schemes (24.4 per cent.) and roads (20.6 per cent.). The direct employment due to all public works schemes never exceeded 59,000, and electricity schemes showed the lowest figure of employment per thousand pounds capital expenditure, largely due to the fact that such a large proportion of the expenditure is transferred to other industries.⁶⁴

The experiences of these attempts allow certain conclusions to be drawn as to the usefulness of electricity supply investment for a full employment policy.

1. In spite of encouragement, appeals and financial support, the response by companies and local authorities was relatively small, which seems to confirm the view expressed in the White Paper on Employment Policy that positive Government direction may be necessary.
2. Certain measures of electricity development are of a long-term character and can be postponed or advanced in accordance with the requirements of national policy.
3. Both the size and the timing of public investment are of vital importance for the success of any full employment policy, and delay in preparing and completing schemes reduces their attractiveness. For the grid schemes, for instance, the time lag was nearly six years from the initial legislative steps to

⁶³ *Ibid.*, 12th Report (1931-2), p. 74.

⁶⁴ Cf. *Unemployment Grants Committee Final Report*, Cmd. 4354 (1933).

the full effect. It would, therefore, be essential to take the necessary legislative steps and to prepare detailed technical plans well in advance to benefit from them at the vital moment.

Investment in electricity supply is distinguished from other public works in that the immediate effect on local unemployment is small and that the main beneficiary is the engineering industry. If large-scale investment schemes are prepared independently by a large number of electricity undertakings, there is a danger that they will create boom conditions in certain industries without relieving depression in others. A co-ordination of investment plans would, therefore, appear essential and some central authority would not only have to select suitable schemes, but might have to take the initiative in evolving alternative proposals when necessary. The closest co-operation between the bodies deciding on electricity development and the authorities charged with the execution of the full employment plan appears necessary. For these reasons, the creation of public electricity supply boards under central control would probably be more useful for ensuring the success of a policy of economic stabilisation than any reorganisation which would leave development policy in the hands of independent local authorities or companies.

(3) *Equality of Tariffs*

There is a considerable body of opinion which regards as highly desirable not only the unification of methods of charge, but the actual equalisation of tariff rates throughout the country. The Scott Committee postulated that, as electricity is an essential service, it should be available in the house of every citizen at the same price in the country as in the town.⁶⁵

On what grounds is this unification of charges considered desirable and what effect will it have on the organisation of the industry? The underlying principle is, of course, the intention to improve living conditions in rural areas in order to reverse the trend of migration to the towns. If charges in the country were no higher than those in the towns, the vicious circle of high prices and low consumption would be broken and the foundation laid for progressive electrical development in backward areas. It is true that electricity is by no means the only factor in the cost of living which may influence the settlement of population in various parts of the

⁶⁵ *Scott Report, loc. cit.*, par 165.

country, and it is also true that many expenses are considerably lower in country areas than in towns. But it cannot be assumed that the inhabitants of the countryside can afford a higher price for the benefits of electricity, for the income and wages of the agricultural community in pre-war days were considerably lower than those in urban areas. No doubt conservative objections to the use of electricity have played a certain part, but all evidence goes to show that progressive development work, combined with attractive tariffs, lead to increases in the use of electricity.

The formulation of a universal tariff is possible on a tentative basis by taking the total expenses of all existing undertakings, say, for domestic sales, and calculating at what tariff the quantities actually consumed would cover these costs. Mr. Kennedy estimated in 1943 that a quarterly payment of 12s. per consumer and a unit charge of $\frac{1}{4}$ d., or alternatively a quarterly payment of 14s. and a unit charge of one-third of a penny would cover all costs.⁶⁶ Professor Miles Walker proposed a fixed charge of no more than 10 per cent. of the rateable value of houses and a unit charge of $\frac{1}{4}$ d. in the winter and .35d. in the summer.⁶⁷ It is widely felt that the unit charge at least should be standardised at $\frac{1}{4}$ d. throughout the country, even though it may be necessary to differentiate in the fixed charge of the tariffs.⁶⁸ It must, however, be kept in mind that consumption would be affected by a revision of rates, with subsidised demands in high cost areas rising (which is, of course, one of the main purposes of the proposal), so that there is a danger that costs and revenue would not balance and necessitate upward revisions of tariffs.

The problems raised by the proposal to unify tariffs are similar to those already discussed in connection with a national policy of agricultural and industrial development, of which it actually forms a special example. The difference consists only in the extent to which electricity is expected to influence the settlement of people and industries. Equal prices throughout the country would remove one of the advantages of densely-populated areas and render rural districts more attractive from that point of view. The policy of assisting a planned industrial development, previously described, however, goes farther by positively encouraging electrical develop-

⁶⁶ *J.I.E.E.*, 90, II (1943), p. 132.

⁶⁷ *J.I.E.E.*, 79 (1936), p. 513.

⁶⁸ *Ibid.*, p. 521.

ment in particular areas and, if necessary, discouraging it in others. It is, therefore, a more radical and abrupt step, whereas a unification of charges will not cause any sudden changes in the number of consumers in any area. From the purely technical point of view, each independent undertaker might be expected to carry on development to the best of his ability, except that he is tied to fixed selling prices. We need not discuss again the problem whether all undertakings are capable of making the best use of the opportunities arising and will therefore tackle the development of backward areas with the necessary speed, but the financial side of the problem must be examined a little more closely.

Even if the controversy whether the cost of rural supply need be higher than that of urban electricity were decided in the negative, i.e. even if the saving of overhead lines should compensate for the small number of consumers per mile of service, for the additional costs of operation and maintenance, etc., there would remain the wide difference of costs ruling as between undertaking and undertaking due to variations in size and efficiency, local conditions and past capital expenditure, and, lastly, in the wholesale prices for electricity charged by the C.E.B. It would, therefore, be impossible to impose a uniform tariff and leave things otherwise unchanged. Some form of subsidy at least will be necessary and the problem arises whether a subsidy can be evolved which at the same time does not weaken the incentive to efficient working. There is a grave danger in paying the difference of cost and revenue of weaker undertakings out of the surplus of efficient bodies, as it may penalise efficiency and thus stifle progress. It is doubtful whether such a system would work for any length of time, as the growth of consumption in backward areas, at least temporarily uneconomic, would call for increasingly large subsidies which other undertakings would be unable to pay without a rise in their tariff rates. As semi-automatic controls, such as sliding scales of profits and dividends, would no longer be applicable, only a complicated system of public supervision might ensure progress and efficiency. Sir John Snell expressed the opinion that an amalgamation on the lines of the McGowan Report would bring rates very much nearer to a common denominator and would thus approach the goal of uniform prices,⁶⁹ but the uneven character of the areas envisaged by the McGowan Report would

⁶⁹ *Min. Ev. to Barlow Com.* (1937), par. 1346.

still necessitate certain financial subsidies if complete equality of prices is desired.

It is conceivable, although the suggestion does not appear to have been made, to utilise the principle of a national uniform tariff as the measure of efficiency of independent distribution authorities in a similar way as generating cost was the measure of generating efficiency by non-selected stations under the 1926 Act. After establishing a single national bulk tariff for all undertakers (which is a *conditio sine qua non* of uniform retail prices) legislation could enforce a single retail tariff, if necessary providing for certain subsidies in capital expenditure and running costs for a limited period. Undertakings not prepared or unable to work successfully at these prices would be taken over by other undertakings or newly-formed public authorities. At first sight, this seems to provide the touch-stone for the preservation or absorption of these undertakings, but on closer investigation the proposal becomes rather less attractive. Assuming that the tariff is fixed at the low rate necessary for full development, higher developed urban undertakings would remain independent, whereas authorities responsible for backward districts could not carry on with the low revenue permitted. Some of them might be absorbed by wealthy neighbouring undertakings, but in many areas they would be left as a State responsibility, for no one else would be found to carry on the unprofitable undertaking. The result would, therefore, be the very opposite of a comprehensive, planned development combining urban and rural loads.

The only satisfactory way towards achieving complete uniformity of charges, if this is the aim of national policy, would appear to be the reorganisation of the industries in public, regional or national bodies which could proceed with the unification of rates in their own areas and eventually reach a uniform rate throughout the country. The standard charge should not be devised by calculation of the existing revenue of the district and the number of units consumed, but would probably have to be based on the estimated balance of expenditure and revenue after electricity supply has been fully developed. For this reason, a strict balancing of expenditure and revenue could not be expected for a number of years. An increase in charges in higher developed areas (which some observers consider likely) should be avoided as far as possible

and should only be permissible in exceptional cases with the sanction of the Electricity Commissioners.

(4) *National Fuel Policy*

In the examples so far given, particular aspects of national policy have been discussed which demanded a specific electricity development. It remains to examine the effects and influences which a national fuel conservation policy may have on the electricity supply industry.

The demand for such a policy is based on the appreciation of the vital importance of this country's coal resources for industrial progress and of the need for preserving and making the best possible use of this wasting asset. Coal conservation formed the subject of a thorough investigation by special committees under the chairmanship of Lord Haldane⁷⁰ which made a number of recommendations for the better utilisation of the existing coal resources, including proposals for the reorganisation of the electricity industry. A joint committee of the Miners' Federation, the T.U.C. and the Labour Party submitted to the Coal Commission in 1926 a scheme which would have transformed the mining industry into a coal utilisation industry, providing for the manufacture of power, coke and smokeless fuel, and chemical by-products. The organisation proposed included a Power and Transport Commission determining policy under the control of a National Coal and Power Production Council.⁷¹ During the inter-war period there appeared to be an excess of coal rather than a shortage, but the need for economising was again recognised during the second world war. Electricity, both an important consumer of and a substitute for coal, can play a part by employing other sources of power and increasing the efficient use of coal.

The most important alternative source of power for generating electricity is water. Water power is by no means absent in this country, but has been neglected in the past owing mainly to the cheapness of coal. In 1921 the Water Power Resources Committee stated that the potential inland water resources in this country had a capacity to produce almost 275,000 kW, and a recent estimate put the figure as high as 650,000 kW, if the Severn Barrage scheme is included. They were, however, exploited only on a relatively small

⁷⁰ Cf. *supra*, p. 100.

⁷¹ Cf. *The Times*, 15-1-26, p. 12.

scale by certain industries particularly dependent on cheap electricity, especially for the production of aluminium and calcium carbide. Various private Bills sponsored by Scottish power companies proposed to utilise the water resources in the Highlands, but were rejected by Parliament.⁷² In 1943 the North of Scotland Hydro-Electric Board was formed for initiating and undertaking the development of all further means of generation of electricity by water power in that area.

This and other wide functions were, in the eyes of the Cooper Committee and Parliament, of such a nature as to require the creation of a new *ad hoc* public corporation. For "the scheme will involve over a considerable period of years planned and carefully co-ordinated development of generation, transmission and to some extent distribution in an area covering in whole or in part the districts of some 12 county councils and over 50 burghs. In its execution, local government boundaries would be entirely irrelevant and the advantages to be derived by each separate area will be bound up by the successful working of the scheme as a whole."⁷³ In contrast to steam generation, the driving power for the turbines is collected over a wide area which must be under single control. The reason for creating a public authority instead of entrusting a power company with the task was the "vital necessity of treating hydro-electric development as an integral part of the wider plans for the regeneration of the Highlands."⁷⁴ It will be seen that the justification for the creation of a public board does not lie in the technical implications of hydro-electric generation, but in the close relation with general regional development, a question already discussed in this chapter.⁷⁵

Another application of water power in the generation of electricity is the use of tidal water. The first proposals for the Severn Estuary were made towards the end of the last war, in 1917. The Ministry of Transport prepared a scheme in 1920 and after an interval of apparent inaction a committee under Lord Brabazon was requested to report on the subject again in 1933. The difficulties in the past were not primarily of a technical nature, but, in view of the high rate of interest on money and the low cost of coal then ruling, this

⁷² For details cf. *Cooper Report on Hydro-Electric Development in Scotland*, Cmd. 6406 (1942), p. 4.

⁷³ *Ibid.*, par. 68.

⁷⁴ *Ibid.*, par. 69.

⁷⁵ *Supra*, pp. 267 ff.

scheme was not considered economically justified. Today money is "cheap," the cost of coal is more than double what it was in 1933, and it is, therefore, possible that a tidal water scheme would now be a paying proposition.⁷⁶ Even if this were not the case, it might be advisable to proceed in the interest of coal conservation, as, according to Sir William Halcrow, the scheme would provide nearly 10 per cent. of the estimated present electricity requirements.⁷⁷ A tidal power installation is bound to affect very closely the public by its influence on water supply, location of industries, navigation, etc., and would, therefore, best be undertaken by a comprehensive public authority.

Water power can only supply a small proportion of the electricity required in Great Britain and for the remainder coal must be used. Unfortunately, even with the most efficient generation, only about 25 per cent. of the heat energy of the coal is sent out as electrical energy, whereas over two-thirds of the heat output of the boilers goes into condensing water and is thus generally wasted. One ton of coal with a heat content of 30 million B.Th.U., when used in a generating station, only creates electricity of a heat equivalent of 6,437,500 B.Th.U. The same quantity of coal would create slightly more gas, namely 7,500,000 B.Th.U., but in addition valuable by-products, such as coke, tar, etc., would be gained.⁷⁸

The waste of heat in electricity generation has long been regretted and after the success in the U.S.A., U.S.S.R. and Germany, the idea of joint plants for generation of electricity and *district heating* has found many adherents in this country.⁷⁹ The principle is to utilise the heat created in electricity generation for heating installations by means of a piped system containing either heated water or steam. The thermal efficiency which can theoretically be obtained by this combined service is about 80 per cent. compared with the 25 per cent. of electricity generation alone. It is not correct to speak of district heating as a by-product of electricity generation, as even under the most favourable conditions the power output can only be a third of the heat output. This necessarily imposes a limitation on the size of each combined plant, as the demand for heat is subject to severe seasonal fluctuations, except for certain industrial

⁷⁶ Cf. W. Fennell, *El. Industries*, 43 (1943), p. 353.

⁷⁷ R.S.A., Cantor Lecture, *J.R.S.A.*, Vol. XCII, p. 559.

⁷⁸ Cf. *El. Review*, 133 (1943), p. 70.

⁷⁹ For most of the following details, cf. *El. Times*, 104 (1943), pp. 384 ff.

purposes. Whilst it is, therefore, unlikely that a high proportion of generating stations will be linked with district heating, the construction of combined plant will provide a clean and cheap heating system, and as a by-product, cheap electricity, just at the time of the seasonal peak load. The reconstruction of bombed cities will give an opportunity for laying the necessary mains, and it is noteworthy that the replanning schemes of the cities of Birmingham, Liverpool, Bristol, and others include district heating plant. The development on a sufficiently large scale might have considerable effects in reducing the marginal cost of electricity at the time of the winter peak and may thus be instrumental in bringing about a substantial reduction in the grid tariff.

District heating would probably be carried out by municipalities on a local scale and does not, therefore, immediately affect the structure of the electricity supply industry. Should generation be taken over by the Central Electricity Board, it might still be advisable to leave the combined production of heat and current in local hands and to arrange for the purchase of the electricity so generated by the C.E.B.

District heating is likely to affect only a relatively small sector of the electricity supply industry and it will still be necessary to consider what other measures can be taken to secure a more efficient use of coal. A comprehensive survey of all the applications of coal may suggest a national fuel policy to bring maximum benefit to the nation, and the formation of a separate Ministry of Fuel and Power may be regarded as a first step in this direction.

Coal is not only essential, directly or indirectly, as a source of power, light and heat, but it is also the raw material for a large number of products of prime importance in modern industry: tar, ammonia, motor spirit, creosote, paints and dyes, plastics and drugs, synthetic rubber, Nylon and many others are derived from this all-important source.

It follows that coal will be increasingly utilised for processing which is likely to lead to an increase, as by-products, of the output of coke and gas. The revenue from these modern uses of coal may be sufficiently high to allow gas to be sold at an extremely low price. On the other hand, the price of raw coal is likely to rise considerably, partly due to its competitive use by other industries and partly owing to the higher wages which will have to be paid to attract and retain miners in the industry. Coal will, therefore, form a more

important item in the cost of electricity than hitherto and this industry may not have the same advantages over its rival as in the past. The result may be dearer electricity, fiercer competition with gas, which, owing to the very high proportion of fixed costs on both sides, would take the shape of undesirable cut-throat competition with consequent instability of prices.

Serious attention should, therefore, be given to proposals for co-operation between the gas and electricity industries for the purpose of using gas as the raw material of electricity generation by means of gas turbines. It may be true that the thermal efficiency of such plant would be inferior to modern steam plant and that at the present costs gas is twice as expensive per therm as raw coal, but if the conditions visualised above become reality, a very drastic revision of outlook and practice may be necessary. Undoubtedly a high proportion of the coal at present used by electric power stations is of such low grade as to be useless for processing. According to the Ministry of Fuel and Power Statistical Digest, 74 per cent. of the electricity generation in 1943-44 was effected by burning slacks and smalls, and less than 12 per cent. by the consumption of grades of coal used in gas manufacture.⁸⁰ There are, however, indications that a further extension of generation would necessitate the use of higher grade coal and even the low qualities are likely to become dearer. Careful research into the possible alternatives to coal is, therefore, of vital importance, including investigations into the practicability of underground gasification in exhausted coal mines.

Should such an investigation establish the desirability, from an economic point of view, of a radical change in generation practice, entirely new methods of joint production may be required, as the existing commercial gas plant may not be the most suitable for the purpose of obtaining gas for electricity generation.

Clearly this calls not only for central research into the whole complex problem of coal utilisation, but also for large-scale joint experiment by the interested industries. If the idea is proved advantageous from a national point of view, a planned changeover would be required extending over a period of years and possibly leaving intact certain highly efficient steam plant which can absorb low-grade coal that has no alternative application. A new technique will

⁸⁰ Cf. *El. Times*, 106 (1944), p. 57.

have to be evolved for which close co-ordination of science and practice and accurate comparison of experience will be essential.

The formation of a National Fuel Advisory Council was announced by the Minister of Fuel and Power in April, 1944. It consists of a small body of experts in the field of science, economics and industry, which is to advise on certain major problems of fuel and power production and utilisation. It remains to be seen whether and to what extent this council will be able to investigate the problems mentioned.

Co-operation between gas and electricity on the highest level does not necessarily mean complete abolition of competition between the two industries for retail sales, especially in the case of large industrial consumers. It may be expected, however, that once the sales of gas are assured, gas supply will be restricted to those applications which show a clear advantage over electricity. The existing practice of installing long gas mains and services to cater for small demands will no doubt be discontinued. If electricity becomes the only source of light and, possibly, domestic heat and power, an additional control over the industry may be demanded to ensure efficient and progressive development and low charges.

IV. POLITICAL PROBLEMS OF REORGANISATION

The objective reasons for reorganisation have now been examined, both the weaknesses in the structure of the industry and the changes that may be required as a part of a planned policy of national development. A large measure of agreement on the means necessary for certain ends can be and has, indeed, been achieved amongst the interested parties. It remains to discuss the subjective side, the organisation necessary for attaining any of the ends previously stated. It is here that the widest divergence of opinion exists ; for radical solutions are widely accepted as long as they do not affect the individual position of the persons in question, but may be considered objectionable as soon as they necessitate personal sacrifice. The experience of frustration which marks the history of electricity supply organisation is mainly due to this human element, to the pressure of organised groups within the industry anxious to maintain their identity, to the antagonism between the municipal and private sector of the industry and other obstacles mentioned, most of which still exist today.

Any scheme of reorganisation must be carefully examined to

ensure that it combines the minimum offence to those affected by the proposal with the certainty that the aims of reorganisation will be achieved and cannot be obstructed by narrow opposition. In the past measures were not infrequently suggested which struck a reasonable balance, but pressure in Parliament upset it with the result that a compromise had to be reached, which meant friction with the minimum of achievement. It appears likely that a bold imaginative measure which appeals to a wide public has a better chance of success than a narrow technical Bill that constitutes the ideal field for "pressure politics."

(1) Desire for Independence

One of the outstanding characteristics of the electricity supply industry in Great Britain is the fact that nearly two-thirds of the undertakings are public, practically all of them owned by local authorities. This has had a profound effect on the development of the industry, as the whole weight of opinion favouring the principle of de-centralisation of democratic powers in local government, pressed also for the development of electricity on a local public basis. Thus the sometimes narrow interests of local engineers, electricity committees and councils found the support of a social philosophy which has a strong appeal to the British people. It is, therefore, not surprising that even the recent memorandum of the I.M.E.A. on the Ownership of Distribution Undertakings reiterated the demand for complete, public local authority ownership of electricity supply.

The structure and functions of local authorities and their capacity to deal with modern requirements has come under renewed and close scrutiny. Both for technical and financial reasons many existing local government bodies are widely considered as too small to render the most efficient service for modern requirements. An expert committee appointed by the National Association of Local Government Officers submitted in the summer of 1943 a report on the reform of local government structure. This report regarded as the major defect "the existence of a large number of small local authorities lacking the population, financial resources and qualified staff to provide service of the standard and technical efficiency required to-day," and proposed the constitution of all-purpose local authorities of adequate size to administer all local government services within their areas. If new regional bodies were formed

either replacing the existing authorities or superimposed for specific functions, they could take over the electricity supply from the existing local authorities and by exercising the purchase rights over companies would, within a reasonable period, be able to manage large compact undertakings with all the advantages of size already discussed. It is, however, possible that the delimitation of areas, for the purpose of regional government, would not coincide with the desirable unit for electricity supply. Reorganisation of local government areas would probably attempt to retain as much as possible of the traditional structure and would join existing authorities rather than cut across existing county boundaries as might, in places, be advisable from the electrical standpoint. In view of the important part which electricity may have to play in a national plan, even a reorganisation on the basis of regional self-government may lead to friction of a kind which will be discussed at a later stage.

Nevertheless, the management of electricity supply by regional governments would have great advantages, but it would be unwise to base excessive hopes on the chance of a far-reaching local government reform.

Is there any hope of overcoming at least the shortcomings of the electricity supply industry within the framework of the existing organisation, by using instead of antagonising local pride in their undertakings? Were the small electricity undertakings justified in their resistance to the McGowan Report, and have they any constructive alternative suggestions? Their answer is to be found in the Joint Committee Memorandum which, whilst admitting the desirability of greater co-operation within the industry, demands that local administration and control should be retained and encouraged on the grounds that a drastic reduction in the number of authorised undertakers will not necessarily result in lower prices or a more efficient service to the consumer.⁸¹ The technical functions of the Area Advisory Committees proposed for implementing the idea of "Organised Co-operation" have already been mentioned,⁸² but it will now be necessary to examine the likelihood of effective action on their part. The Committees would give equitable representation to the various sections of the industry within the area, excluding local authorities holding purchase rights over

⁸¹ *Loc. cit.*, par. 46 f. and g.

⁸² *Supra*, p. 256.

electricity undertakings. They should comprise not less than 10 and not more than 14 members, of which at least half should be electrical engineers of undertakings within the area ; the chairman should be appointed by the Electricity Commissioners. The Committee's recommendations would be examined by the Commissioners, who could confirm them, after which they would be binding upon the undertakers. Two safeguards for existing undertakings are provided, namely that, on the application of any party which considers a recommendation detrimental to its interests, a local enquiry must be held, and further, that any proposal for the compulsory acquisition or amalgamation of an undertaking should be subject to an appeal to the Minister of Fuel and Power and to the approval of Parliament. Assuming that the Area Committees make effective proposals for the improvement of electricity supply, there is a reasonable hope that in due course, after a certain delay, the recommendations may be enforced against recalcitrant authorities ; but are the Area Committees likely, indeed are they intended, to make effective recommendations ?

The Committees are exclusively producer associations on which consumers' interests have no voice. There is undoubtedly a tendency in associations of this kind to maintain the *status quo* rather than to bring about alterations which may hurt some of their members. Especially on a body where there is no competitive urge, where no member is likely to gain anything by stirring up trouble, it is difficult to see why anybody should take the initiative. But even if they had a reforming urge, their powers would be severely circumscribed. In addition to the delays and safeguards already mentioned, there is the specific proviso that, except where there is mutual agreement between the parties concerned, the Area Committees should not recommend nor should the Electricity Commissioners or the Ministry have power to make or confirm any order that an undertaking or part of an undertaking should be transferred, unless they are satisfied that substantial and permanent benefit will thereby accrue to the general body of consumers of the undertaking proposed to be transferred.⁸³ It should be noted that this clause, designed to perpetuate the existing undertakings, is also to apply to all company undertakings subject to a purchase clause and that all purchase rights are to be in abeyance pending the formation of the Area Committees.

⁸³ *Loc. cit.*, p. 54

In spite of the provision for compulsory enforcement, the character of the proposed Area Committees bears close resemblance to the various attempts to achieve co-operation of undertakings by voluntary means, such as the Advisory Boards under the 1922 Act. That these earlier measures failed is not an accident: voluntary co-operation can only succeed if the common aims coincide with individual interests. The remedies for the existing weaknesses of the electricity supply industry are not always and by no means immediately to the advantage of the individual undertakings. Without financial assistance neither technical standardisation nor extensive development of electricity is likely to be achieved, unless a majority of undertakings in an area are particularly progressive and sufficiently enthusiastic to want to bring up the standard of backward undertakings. This is likely to be the case only in exceptional circumstances. If subsidies are to be granted, it would appear undesirable to place the financial burden on the authorities in the area, as this would dampen the reforming spirit of the Area Committees even further. If it be accepted that control and financial responsibility should be in the same hands, the Area Committees appear unsuitable even on this ground.

There are other and potentially more effective methods of controlling electricity undertakings, such as the one chosen by the 1919 Act, which gave the Electricity Commissioners powers of instructing undertakers to enter into agreements for mutual assistance,⁸⁴ to alter the type of current, frequency or pressure in the interests of standardisation.⁸⁵ The Commissioners have accordingly most of the powers which the Joint Committee Memorandum suggested for its Area Committees, and thanks to their independent position they are better qualified to enforce them. The results in the past, however, have been small, not due to any absence of enthusiasm on the part of the Commissioners, but because of their inability to give financial inducement and assistance. Frequency standardisation was a charge on the whole industry and was carried out with speed and efficiency, but the Commissioners had no mandate to proceed with voltage standardisation in a similar manner. There is good reason to expect that they are capable of enforcing this and other improvements throughout the industry, if given the necessary power and funds, but success can only be assured if the

⁸⁴ Par. 19.

⁸⁵ Par. 24; cf. *supra*, p. 137.

task is well defined. Central control is not likely to overcome inertia, excessive caution or out-of-date methods, nor can it ensure the most efficient use of subsidies. To remedy some of the weaknesses of the industry, whilst completely maintaining its present structure, can only be done at the price of complicated control; and success, at best, would be uneven.

(2) *Absorption by Larger Undertakings*

It appears improbable that with the existing structure of the supply industry a solution can be found by which backward and obstructive undertakers can be forced to adopt a progressive development policy. Even if this could be achieved, the disadvantage of unsuitable size would remain and would make desirable a more far-reaching reorganisation involving the creation of larger units. The condition of success is not only size, but also comprehensiveness and diversity of load. From the early days of the industry the solution proposed was the absorption of the small undertakings by their larger neighbours, such as that of small towns by power companies, and both the McGowan Report⁸⁶ and the White Paper on Electricity Distribution⁸⁷ recommended this as the least revolutionary means to the desired end. There are obvious advantages in this method, such as the continuity of control in the larger part of the area, and the assurance that local knowledge and experience will be utilised, and that the amount of compensation payable to the expropriated undertakings will be kept at a minimum.

Nevertheless, absorption gives rise to a number of difficulties of a technical, administrative, and political nature. The danger that the engineer in the absorbing body may not be able to cope with the needs of the newly-acquired district has already been mentioned. There is an equally strong possibility that the men directing the policy will remain primarily interested in their original undertaking, and will not be prepared to sink sufficient capital in the development of the new area. If the undertaking is a municipality there may be strong pressure by the Council to think in terms of the centre rather than of the whole district, to favour urban rather than rural development and to shrink from investment of an experimental nature. An insistence to control policy in its own way is shown by the recent refusal of the Wimbledon Council to admit to their

⁸⁶ *Loc. cit.*, par. 88, 2.

⁸⁷ *Loc. cit.*, p. 10b.

Electricity Committee representatives of other local authorities receiving electricity supply from Wimbledon. A company may show less local sentiment, but will generally base its policy on considerations of profit; development will not aim at an even spread of electricity, but rather at the maximum use of existing capital investment. There is no guarantee that the large undertaking will devote the necessary effort and initiative to the development of backward areas, otherwise there would be no inefficient large undertakings. The McGowan Committee, therefore, whilst expressing the belief that an undisturbed franchise would encourage an enterprising and progressive policy, considered some central control necessary and proposed to give the Electricity Commissioners power to require undertakings to submit and carry out an approved scheme of extension from time to time for any undeveloped part of their area, where a reasonable prospect of economic return existed.⁸⁸ Such a provision (which is in accordance with the policy adopted in the provisional order procedure for distribution undertakings) would give a certain guarantee that development will be carried out, but is open to conflicting interpretations of what constitutes an economic return.

The benefits from the creation of larger units by the absorption of small undertakings are by no means automatic and central control is necessary even for development work promising an economic return. It would be unwise and unfair to expect independent concerns to collaborate in any national plan to the extent of carrying out uneconomic extensions without subsidy, which in turn necessitates complicated checks and controls. The "simple" method of absorption thus requires props and supports which may rob it of its advantages even in the eyes of its original protagonists.

Objections of a more specifically political nature are further bound to be raised against the absorption of undertakings, if it involves a change from private to public or from public to private ownership. Although the days of heated controversy on this subject may have passed, a certain amount of hostility and mutual suspicion still remains. The history of the formation of the London and Home Counties J.E.A. gives ample evidence how this antagonism delayed and weakened the creation of an authority and how at one stage it seemed only possible to come to an agreement by the

⁸⁸ *Loc. cit.*, par. 226 f.

creation of two practically independent bodies, one comprising the local authorities and the other the companies. The antagonism is frequently strongest against the immediate neighbour who may have previously attempted to gain a strangle-hold, or, on the other hand, may have resisted what seemed a rational and logical expansion. Any proposal of absorption would, therefore, be opposed with special bitterness.

The objections are, however, by no means only part of the inheritance of the industry and without justification; on the contrary, there are weighty reasons against this method of enlarging the units of electricity distribution. Municipal enterprise is based on the idea of democratic self-government, on the assumption that the citizens of a town will ensure the best possible service by entrusting their electricity committee to decide policy and supervise the technical staff. The inhabitants of outside districts absorbed by a municipal undertaking depend on the policy of a body which is not only not responsible to them, but has been specially appointed to further other interests. It is true that this state of affairs already exists in many parts of the country and frequently works very well, but generally the local authority has a purchase right against the operating municipality, as it would have against a supply company. A further disintegration of areas by the use of these purchase rights would be most undesirable on technical grounds, but, on the other hand, the electricity development of some districts should not indefinitely be entirely at the mercy of a neighbouring local authority. The alternative of voluntary joint boards was provided for in the 1909 Act, but has generally been a dead letter, as neighbouring towns are not always close friends anxious to collaborate. Other methods of reorganisation have to be adopted to ensure a satisfactory solution.

The absorption of companies by other companies does not raise similar immediate problems and can be effected without difficulty. Such amalgamations were favoured by the London Electricity Acts of 1925, but they were not adopted to the extent anticipated. Safeguards may be necessary against the payment of excessive purchase prices which would militate against a reduction in tariffs, but the major problem is the question of an eventual transfer to public ownership. Power companies are at present not subject to purchase, whereas the franchise of distribution companies expires at certain fixed dates. Obviously any reorganisation scheme would have to guard against the disintegration of consolidated undertakings.

The McGowan Committee considered the absorption of distribution undertakings as a most valuable concession to the power companies, in consideration of which they should surrender their perpetual rights and submit to their ultimate transfer to public ownership, the maximum period being 50 years.⁸⁹

It is understandable that companies will only carry out a thorough development policy if the franchise is sufficiently long to ensure an adequate return on large-scale expenditure. Whether the claim of the power companies that the period should not be less than 50 years⁹⁰ can be accepted is the question at issue.

But is the eventual transfer of company undertakings to public ownership altogether desirable ? The McGowan Committee saw no justification for altering the principle of all electricity legislation that a public service such as electricity should ultimately be a tool of public policy in public hands.⁹¹ The Joint Committee Memorandum on the other hand proposed the suspension of all purchase rights and their virtual abolition, the I.M.E.A. Memorandum at the same time reaffirmed the principle of public ownership in the strongest terms. The power companies expressed doubt whether the type of control best suited for the national needs 50 years hence can be foreseen, and implicitly recommended the continuation of the present system of private control.⁹²

There is no evidence that the arguments in favour of eventual public ownership have been weakened since the 1880's ; on the contrary, the growth of State responsibility, which makes comprehensive national planning a legitimate and possibly necessary functions of the State, has lifted the discussion above the level of quibbling about efficiencies on to another plane, where the compatibility of private or local enterprise, however efficient and progressive, with broader and more important aims is the main consideration.

It is most unlikely that any Government or Parliament would be prepared to jeopardise the possibility of the national direction and administration of the electricity supply industry by granting supply companies unlimited franchise, although it may be advisable to transfer the purchase rights from local authorities to larger and

⁸⁹ *Loc. cit.*, par. 164, 169 ff., 192.

⁹⁰ I.A.E.P.C. Memorandum, par. 62.

⁹¹ *Loc. cit.*, par. 188.

⁹² I.A.E.P.C. Memorandum, par. 62.

more comprehensive bodies. If the country determines to embark on a policy of comprehensive planning, then the organisation of electricity supply as a suitable instrument of the national plan will need to be carried out as speedily as possible and no further extension of company franchise could be permitted. On the other hand, if no such policy is decided upon, the advantages of continuity of control have to be weighed against the uncertainty of tenure which is likely to act as a brake on company development at a future date.

It is in the light of these considerations that we have to examine the proposal inherent in the McGowan Report that the absorption of undertakings might also mean the taking over by companies of municipal undertakings. The opposition to such an action would be very considerable, especially as the incorporation of a small town in the supply area of a large rural electricity company will frequently not bring any short-term advantages to the urban consumers. There is a prospect of continuous friction and complaints, possibly quite unfounded, that the town users, forced to subsidise rural development, have to make sacrifices to swell the profits of companies. The financing of rural development by Government subsidy or the fixing of uniform charges throughout the country would remove this source of friction (the difficulty of effective supervision of the use of public funds has already been discussed), but on general grounds it appears undesirable to increase the share of private enterprise in an industry if it is decided to vest it completely in public hands at a later date.

It must, however, be admitted that in certain parts of the country the amalgamation of areas may be so essential for the adequate development of electricity that in the absence of a better solution even the absorption of small public undertakings by companies would be preferable to the *status quo*. If, however, the needs of national economic planning are considered paramount, a system of independent electricity supply undertakings would necessitate a complicated superstructure of Government checks and interferences which may be unable to secure success and efficient operation.

(3) *Formation of New Authorities*

The history of electricity supply is full of proposals for forming larger units by the creation of new public authorities. The 1909 Act foresaw joint boards of local authorities as an alternative to the growing influence of power companies; hopeful experience in

Germany with mixed undertakings inspired the London County Council proposals for a mixed board in 1914 ; the appreciation of the imperative need for large units of supply incorporating company and local authority undertakings, combined with the desire to secure the widest co-operation from the local bodies, led to the conception of representative J.E.As. under the 1919 Act ; the decision in 1926 to rationalise generation and to combine ultimate public control with business methods was responsible for the formation of the Central Electricity Board, an example of a public service board that has been adopted in many reorganisation proposals.

If public boards are created in preference to alternative methods of reorganisation, it will be because they are considered to provide in a unique way a combination of business efficiency and responsibility to the public. Efficiency includes adaptability to changing conditions, flexibility in following new developments and a willingness, if necessary, to take risks. There will have to be some kind of public control both as regards the broad aims of policy and the manner in which the policy is translated into service to the consumer.

In present-day discussions there is a wide measure of agreement as to the character of a public electricity distribution authority, namely that its policy should be determined and controlled by the public through some Government organ, but that extensive freedom of action must be left to the executive in view of the commercial character of a large part of the work. Close supervision of its day-to-day routine would be undesirable. A difference of opinion exists as to whether the new authority should cover the whole country or whether regional boards should be constituted and, further, whether the boards should be responsible upwards through a Minister to Parliament, or downwards through representation to local authorities. The former distinction is not of an exclusive character, as even the protagonists of a single national board accept the need for suitable sub-division and delegation of power to regional units, so that the difference becomes one of emphasis rather than of principle.

In the following subsection the merits and disadvantages on the one hand of representative regional boards and on the other hand of selected public service boards will be considered.

(a) Representative Regional Boards

The type of representative regional board which has been suggested as suitable for the reorganisation of electricity distribution differs fundamentally from the district boards and joint electricity authorities envisaged in the 1919 legislation.

The function of a J.E.A. under the Electricity Supply Act, 1919, was the specific one of co-ordinating generation and main transmission, whilst leaving retail distribution in the hands of independent local undertakings. The new joint authorities were to be superimposed over the existing structure of the industry in the hope of thus bridging the gulf of disagreement and mutual suspicion which existed between company and local authority undertakers. As a result, a majority of members of the authority were to be representatives of the supply undertakings.

In a board of this type the divergent interests of the constituent parties would probably be projected into the new authority and would involve it in internal friction and disunity. It may be that the McGowan Committee had this in mind when they condemned elected public boards as unsuitable for the purpose of electricity distribution.

The situation would, however, be different in the case of a board taking over all existing electricity undertakings and becoming solely responsible for distribution in its area. The present owners, local authorities as well as companies, would have to be fairly compensated, but their interest in the new board would be limited to a financial claim and would not extend to any powers of control. No electricity supply undertaking as such would be represented on the board. Its members would be mainly appointed by the County Councils and other local authorities in the area with the possible addition of representatives of Labour and Industry. In order to ensure the co-ordination of regional development with national policy, it may be desirable to provide for the central government to appoint one or more members to the board. In the absence of larger regional, all-purpose authorities, a board so constituted would be dominated by local authorities and would, in effect, be an adaptation of the principle of municipal trading to the requirements of large-scale organisation.

With one important exception, there is a close resemblance between a regional representative board and a municipal trading organisation. The control of a municipal enterprise is in the hands

of laymen, councillors elected to a trading committee without technical qualification for the task but representing the consumers' interests. They are expected to approach and decide questions of policy with the broad common sense which is the result of their varied experience in other spheres of life. The committee take their decisions within certain statutory limits and supervise the engineer responsible to them for carrying out their policy.

In a similar way, a representative board is a policy-making body, but whereas the members of a municipal committee are elected by and directly accountable to the local ratepayers, the control of a regional board would be only indirectly democratic. Its members would each be appointed by one or more local authorities and would be responsible to the public through them. Although their function would be the development of electricity supply in the region as a whole, many of them (namely all members appointed by local authorities) would only be subject to local supervision and pressure. If the board carries out its proper functions and decides on a broad, progressive development policy, some of its members may find themselves in conflict with the interests they have been appointed to represent.

The importance of this potential cause of conflict will be examined presently, but, assuming that the regional interests can be satisfactorily safeguarded, there remains the danger of excessive regional self-sufficiency and opposition to national policy. Lack of uniformity in practice, both technical and commercial, has been an obstruction to progress in the past and is one of the reasons for considering the reorganisation of the electricity supply industry on the lines of grouping the present multitude of undertakings into a small number of regional boards. It would, therefore, appear necessary to empower a suitable central authority, such as the Electricity Commissioners, to secure the introduction of uniform standards and other measures in conformity with the aims of national policy.

The experience of central public control in this field shows that it can ensure compliance with measurable standards, but is not particularly suited for enforcing positive action of a more general nature, such as the efficient running of an undertaking. Central control, to be effective, would have to become interference, which is likely to cause friction and duplication of effort.

A number of reforms essential for the growth of electricity

supply can easily be subjected to central supervision. Standardisation of voltages and systems, of methods of charge, the unification of tariff rates throughout the country are all measurable objectives and could with appropriate new legislation even be enforced under the existing structure of the industry. A political decision to provide electricity to every house or farm in the country would still fall in this category, although it would raise in an acute form many questions of compensation and subsidy.

On the other hand, there is no simple yardstick for measuring the efficiency of undertakings or their response to the demands of national policy, nor is it easy to check whether expenditure incurred in carrying out such a policy has been entirely necessary and qualifies for a financial subsidy. Admittedly, the controlling powers of the Electricity Commissioners could be strengthened, but could they be rendered effective enough to enforce a course of action on a regional board against its interests?

If the broad policy of electricity development is determined nationally by Parliament or some central body responsible to Parliament, is there any need for other policy-making authorities, such as representative regional boards? Can the implementing of this policy not be safely entrusted to an expert executive body?

The answer depends largely on the nature of the national policy and the extent to which it details a course of action, or delegates this function to other policy-making authorities. Should Parliament decide on a comprehensive national planning policy and create a central organisation to determine the lines of general development, it would probably reduce the problems facing a regional electricity board to technical and financial questions, on which a body of laymen would be unfitted to take a decision. A general instruction or advice to develop rural electricity or to assist the growth of new industries in certain parts of the country, accompanied perhaps by the promise of a subsidy, could be followed in a variety of ways: a regional board would have to determine the specific solution best suited to the area and would consider what sacrifices, if any, should be demanded from other consumers for the benefit of a financially weak class of user.

The argument in favour of representative boards is principally based on the close contact of this type of organisation with the final consumer and the ease with which suggestions and criticism from the public can be ventilated and brought to the board's considera-

tion. Any citizen can lodge a complaint against the board with his local council, who can call upon their representative to investigate the matter and ensure a satisfactory solution. The responsibility is not as direct as in the case of a municipal undertaking in view of the peculiarity of constitution already mentioned, but in questions of service and efficiency local councils may be expected to act in harmony. Local interest and pride should generally be adequate spurs to progressive enterprise.

This receptiveness on the part of regional boards to local pressure may, as already mentioned, cause difficulties, if there is a conflict between the interests of the region as a whole and any part of it. Examples are not difficult to find : standardisation of pressures or systems throughout an area is desirable and indeed essential, but it would be understandable if a local authority that had, prior to the creation of the regional board, financed the standardisation of electricity supply in its own local undertaking out of revenue were unwilling to share the expense of bringing more backward areas into line. In the interest of rural electrification it may be necessary to subsidise rural consumers at the expense of urban users. The sacrifice would probably be very small and safeguards could be provided against an increase in tariff rates to the urban population, but an eager town council might object to forgoing any reduction in charges which might have been possible without the rural development.

The instances quoted are cases where the opposition can claim a good deal of sympathy and where a fair solution would consider some compensation or, at least, limit the extent of the sacrifice demanded. The danger in a representative board, however, is that the development policy as such may be successfully opposed and measures essential to electrical progress left in abeyance.

The possibility that large-scale measures may be vetoed by local pressure is not peculiar to the electricity supply industry. It arises in many spheres of public activity and the formation of regional government bodies has been advocated as a satisfactory solution of the problem. If such authorities were created, they could, amongst other functions, take over electricity distribution. Should the areas determined for all-purpose regional authorities be unsuitable for electricity supply, it would be possible to set up regional electricity boards with a large proportion of members appointed by the regional authorities. Regional boards so constituted may be

expected to become effective instruments of development.

A representative board would require capital both for the execution of its development schemes and for the compensation to the owners of the undertakings it had taken over. The proposal by the London and Home Counties J.E.A. for the creation of an electricity distribution board for Greater London, 1943, provides for compensation to be satisfied by the issue of stock instead of payment in cash. If the reorganisation of the industry was carried out throughout the country more or less simultaneously, the capital requirements of the various regional boards would arise at the same time. Even if the Electricity Commissioners were granted control over all capital issues, they could not prevent a clash on the market, if each regional board had to invite public subscription to its stock independently. Although a competitive scramble for capital by the offer of more favourable terms could be prevented through an agreement on uniform conditions of issue, there is a danger that backward areas requiring capital most urgently might be unable to secure the necessary funds, as investors would prefer the greater safety of stock issued by boards in highly developed districts.

The difficulty could be overcome by the Treasury guaranteeing the interest on all capital issues by regional boards. Alternatively, if it was decided that a national body, such as the Central Electricity Board, should acquire ownership of all existing electricity undertakings could issue stock on the security of the supply industry in the country as a whole. The regional boards would have to apply for the capital necessary for their development work to the central authority which would thus be in a position to exercise some control over their capital investment, should this be considered desirable.

The adoption of either suggestion would mean, to some extent, the separation of financial responsibility from actual operational control, which may be regarded as undesirable. A statutory obligation for each board to equate revenue and expenditure over a period of years, coupled with the need to satisfy the central authority of the justification of any demand for capital, may, however, be relied upon as a sufficient check on careless spending.

The question whether a representative regional board would be suitable as an instrument of reorganisation for the electricity supply industry, whether it would meet the requirements of efficiency, respond to the demands of national policy and to the wishes of the

local consumers, cannot be answered unequivocally. If the relation between the State and the economic life of the nation remains substantially what it was before the war, i.e. if in general the central government only gives broad directions and leaves the decision of detailed issues of policy to individual and local forces, then a representative regional board constitutes an appropriate solution. There might be friction and delay, there might be a predominance of the parochial outlook, but the board would combine large-scale organisation with democratic control.

Should local government reform lead to the creation of powerful regional authorities with wide functions of planning, they could either undertake electricity supply themselves or appoint representative boards responsible to two or three regional governments.

If this nation embarks on a comprehensive central planning of its economic life, the formation of additional regional policy-making bodies would not only appear unnecessary, but likely to cause friction and delay. Financial control by some central authority would go some way towards establishing the supremacy of the national interest, but it may not be capable of ensuring the efficiency of the boards.

(b) *Public Service Boards*

In the reorganisation schemes for electricity supply, the idea of representative authorities has not found much approval, largely perhaps because it has been closely identified with the cumbersome constitution of Joint Electricity Authorities⁹³; instead "the amalgamation of a number of undertakings into some form of public authority constituted on a selected basis" has enjoyed greater popularity. Various names have been suggested for this type of authority, such as "Public Corporation,"⁹⁴ "Public Utility Trust,"⁹⁵ or "Public Service Board."⁹⁶ The last-mentioned term will be adopted in what follows as being the least ambiguous; service to the public is the aim which is to be secured by a constitution designed to combine flexibility and initiative with effective control by the community.

⁹³ Cf. *McGowan Report*, loc. cit., par. 156.

⁹⁴ Cf. H. Morrison, *Socialisation and Transport* (1933); L. Gordon, *Public Corporation in Great Britain* (1938).

⁹⁵ M. E. Dimmock, *British Public Utilities and National Development* (1933).

⁹⁶ W. Robson, *Public Enterprise* (1937).

The first distinctive feature of a public service board is that it is an executive consisting of a small number of men selected for their special technical, administrative or managerial qualifications for the task, in contrast to a representative board which is a policy-making body. This difference indicates immediately the purposes for which this type of organisation is most appropriate: where the main function is that of implementing and carrying out a particular policy laid down by an outside authority, a qualified executive appears to be most suitable and capable of making the day-to-day decisions necessary to meet the varying needs and conditions of a dynamic economy.

The combination of a large measure of self-government and freedom from interference with the formulation of policy and broad control of its execution by some organ of democratic government is the main peculiarity of a public service board. It is, however, not immediately apparent in all cases. Some of the boards formed in Great Britain during the inter-war years were so restricted in scope by statutory limitations that they were allowed practically complete autonomy for the execution of the specific tasks allotted to them.

The London Passenger Transport Board, for instance, is expected merely to provide the most efficient transport for the London area and is officially not concerned with the broad issues of London's growth, although the availability of transport facilities is an important factor in determining the movement of population. The Central Electricity Board controls electricity generation and transmission, but is not authorised, with a few exceptions, to influence the development of electricity distribution. The Tennessee Valley Authority in the United States, by contrast, has the most comprehensive function of planning the best utilisation of all resources in a large region, including flood control, agricultural and industrial development, navigation and electricity supply. Broad political issues are involved, which, according to Mr. D. E. Lilienthal, one of the directors of the T.V.A., should not be decided by experts and administrators. He states in his interesting report on the achievements of his authority⁹⁷ that freedom from interference in carrying out policies determined by Congress makes it imperative that the policies themselves should be under constant control and review by Congress as the instrument of politics.

⁹⁷ T.V.A., *Democracy on the March*, Penguin Special, p. 161

What should be the degree of independence granted to a public service board charged with the task of electricity distribution? New public boards are most likely to be formed if Parliament decides that electricity can play an important part as an instrument of public planning. The functions of an electricity distribution board would be wide and closely interrelated with other aspects of national policy. It follows that the broad lines of electricity development policy would have to be determined by Parliament and that a responsible Minister would give directions to the board and carry out a broad control of its actions. Otherwise, as Lilienthal states, "when managers and technicians in business or in government are permitted to use the leverage of their authority and expert knowledge to lodge irresponsible power in themselves, the foundation of democracy is threatened at once."

However important the need for broad views and schemes in electricity development, the success or failure of the policy will always be felt locally, in the homes and factories. Plans of electrification must be translated into reality by an efficient and vigorous authority free from the restrictive controls and inhibitions usually associated with civil service but in close contact with the body of consumers. Public service boards require wide powers of action and should only be accountable for their management as a whole, perhaps during an annual debate in Parliament, as suggested by Robson,⁹⁸ unless problems of major importance arise. On the other hand, there should be a possibility of punishing the failure of a board to carry out the prescribed policy by the dismissal of inefficient or obstructive members.

In view of the large degree of independence that should be allotted to the board, the appointment of suitable members is of first-class importance. The choice should be made by the authority which directs and controls the board, which would probably mean the central government. The practice adopted in the case of the Central Electricity Board, namely that the Minister makes his nomination after consultation with the various interests most concerned, such as local authorities, industry, transport and labour, is designed to ensure, as far as possible, a friendly atmosphere between the board and its customers and to reduce to a minimum any personal causes of friction.

⁹⁸ *Loc. cit.*, p. 379.

The absence of any direct responsibility to local opinion has been considered as a weakness of the public service board, as it may lead to bureaucratic high-handedness. Provision could be made for complaints to be raised in Parliament through questions by M.P.s, but this would amount to Parliamentary interference in detail, which is against the principle of this type of board. It would also be a complicated and cumbersome method of settling disputes between the board and local consumers.

The suggestion has been made in various quarters that local advisory committees should be formed to express the local point of view. Their members might be elected or appointed by the various groups of interests concerned, such as local authorities, industry and transport, women's associations, etc. The committees should be in regular close contact with the local executive officer of the board. Provision would have to be made that in case a public service board refuses to consider and act upon reasonable advice given by an advisory committee, appeal could be made to the responsible Minister or the Electricity Commissioners acting on his behalf.

In the distribution areas under the control of the London and Home Counties J.E.A., local joint advisory committees have been formed, consisting of local authority and company representatives. Their functions have been purely advisory, but recommendations were made to extend their tasks to furnishing reports and proposals on local conditions and requirements on their own initiative and to act as liaison between the authority and the consumers. To ensure proper consideration of the Advisory committees' views, it was suggested that the discussion of their reports and proposals should form a regular part of the agenda at committee meetings of the Authority and the local authorities concerned.

An organisation of this kind, given proper encouragement and support, can be expected to safeguard consumers' interests effectively and to counteract any bureaucratic tendencies in the executive body. It will be the more successful, if in place of one national board a number of regional boards are created.

In a *nationally planned society* a single central electricity distribution board, subordinated to the planning body, has been suggested as more appropriate.

An organisation of this type was proposed by the Labour Party in its 1932 Report on the Reorganisation of the Electricity Supply

Industry.⁹⁹ It suggested the formation of a National Electricity Board to take over all existing undertakings, supersede the Electricity Commissioners and C.E.B., and be responsible for the proper direction and efficient management of the nationally owned undertaking. Parliament would lay down the national electricity policy by Statute; the members of the Board would be appointed by a Cabinet Minister. Local administration might be carried out by regional boards, but the executive officers in each region would be responsible to the national board. The proposal further provides for a national consultative committee appointed by the Minister, broadly representative of consumers, labour in the industry and local authorities.

Similar suggestions were put forward by the Electric Power Engineers Association in 1943, with the difference that the Commissioners would be retained as an independent judicial body. Distribution regions would be formed, each under the control of a regional distribution engineer and manager appointed by the national board. There would be a further sub-division of the region into districts for local work and contact with the consumers. The proposal also provides for the creation of regional consultative committees constituted of representatives of consumers, industry, local authorities, transport, agriculture and employees, all appointed by the Minister, with the right of appeal to the national board and finally to the Commissioners. The 1944 Labour Party Report on "Coal and Power" stressed, in contrast to the 1932 Report, the view that the organised planning of the industry can only be achieved on regional lines and proposed the establishment of regional selected boards under the direction and control of a national board.

A bold reorganisation on a national scale could sweep away all local obstacles to reform and allow the creation of distribution districts on purely technical and economic considerations, and a development of electricity service in the interest of the country as a whole. The various aspects of national planning could be effectively co-ordinated and electricity could play its part as a vital instrument of national economic policy.

The concentration on the national aspect of policy, which would be natural for a centralised organisation, may, however, lead it to

⁹⁹ *Socialism in Action, The Reorganisation of the Electricity Supply Industry* (1932).

neglect its major function, that of giving efficient service to the consumer. It is only by close local contact that the consumers' requirements can be clearly understood. There may be a tendency at the centre to disregard local needs and to impose an unnecessary and deadening uniformity of practice and treatment throughout the organisation.

This danger, although a very real one, could be avoided by a suitable delegation of power, and encouragement of individual initiative, amongst the regional and district officers of the board. In some of the largest and most successful business concerns of today, including electricity supply undertakings, the centre of control is remote from the actual area of supply, but considerable discretionary powers have been granted to the local executives.

On the other hand, a national, Government-selected, consultative committee would not appear to be a suitable instrument for expressing local views and criticisms. Even if there is only one national electricity supply board, it would be advisable to constitute elected advisory committees for smaller areas, such as administrative districts, possibly joined together for specific purposes in a national council of advisory committees.

If the pattern of economic control should not be based on centralised planning, but on a large measure of independence under the general direction and supervision of the central government, electricity supply might be organised in a number of *regional boards* with a national authority for co-ordinating and controlling their activities. A scheme of this kind was proposed by G.H. in 1934.¹⁰⁰ which provided for the vesting of ownership of all the existing undertakings in the C.E.B., but recommended the division of the country for distribution purposes into about 10 regions, each managed by a regional board. The six members constituting a board would be appointed by the Government after consultation with the local authorities and labour in the regions concerned. A joint national committee comprising the chairman of each regional board and the chairman and general manager of the C.E.B. would co-ordinate the efforts and plans of the various authorities, but the C.E.B. would have to approve schemes for the extension and co-ordination of distribution, and would supply the necessary capital for any development and standardisation. Regional con-

¹⁰⁰ G.H., *The Socialisation of the Electricity Supply Industry*, New Fabian Research Bureau (1934), p. 62.

sultative committees could be established, appointed by the local authorities, industry and workers.

Each regional board would have considerable scope for individual initiative in satisfying the needs of its particular district, and would be directly responsible to Parliament for its management. Local criticisms and suggestions would be likely to find serious consideration by the boards and could speedily be translated into action, as no point covered by the broad policy laid down by Parliament need be referred to "higher quarters," but could be settled on the regional level. The result would be a certain diversity of development, which should be beneficial to progress, as long as the central control of the Joint National Committee and the C.E.B. is sufficiently strong to ensure uniformity of practice in essentials.

The regional solution would be particularly suitable for assisting national policy in the so-called Development Areas. The Cooper Committee on Hydro-Electric Development in Scotland referred to the vital necessity of treating electrical development as an integral part of the wider plans for the Highlands. They recommended the formation of a separate executive authority superimposed over the existing electricity supply undertakings to carry out the electrification scheme with full regard to northern conditions and interests.

The creation of *purely regional boards* without any central government control would only be practicable if the structure of government were reformed on regional lines, with regional government bodies determining policy and supervising the electricity boards. As, however, a large measure of standardisation and uniformity of supply throughout the country is essential, it would be necessary, in the absence of a central controlling authority, to fix in detail statutory obligations regarding the technical and commercial conditions of supply. This may lead to friction between national requirements and regional interests, to which reference has already been made in connection with representative regional boards.

In the exceptional cases for which the McGowan Report and the M.O.T. White Paper on Electricity Distribution, 1937, visualised the formation of a public authority, namely when amalgamation of neighbouring undertakings proves impossible, they suggested the creation of area bodies with functions and responsibilities similar to those of other large electricity supply undertakings. The White Paper proposed a grouping of undertakings into 30 districts, many of which were to be subdivided into groups and sub-groups. The

members of a public board formed under this scheme would be appointed by the responsible Minister, but would apparently be practically free from any public control. The sphere of interests of these authorities would be entirely local and it would, therefore, appear advisable to subject them effectively to a local democratic control. The creation of a representative board would probably be preferable to a public service board.

V. CONCLUSIONS

The present position of electricity distribution has now been surveyed and attention drawn to its shortcomings and potentialities. The shortcomings are largely an unhappy legacy of the past—of an organisation which favoured small-scale independence and self-sufficiency and discouraged broad planning and control. For the potentialities of the future we look beyond a mere continuation of the present upward trend in electrical development and include wider functions in the service of a national economic policy.

The existing weaknesses can be attacked in a variety of ways, from "organised co-operation" to complete reorganisation of the industry, but the less the existing structure is touched the more complicated will be the machinery by which the improvement is brought about and the more doubtful the ultimate success, even with legislation compulsory in character.

Without any "political" aims, but simply for the purpose of securing the most efficient supply of electricity, it would appear necessary to reduce the number of separate undertakings and consolidate them in larger units, however formed. On this basis, the technical proposals of the McGowan Report can still be accepted as generally correct, but serious objections, both political and administrative, to the absorption of undertakings by their neighbours will have to be overcome.

The extent of State enterprise after this war and its position within the economic life of the nation is not yet decided, but the White Paper on Employment Policy gives evidence of a remarkable unanimity of opinion on the necessity of stabilising economic fluctuations by State action. The investigation into the necessary machinery may prove that the only hope of maintaining the capitalist system without recurring depressions and large-scale unemployment is to bring under close Government control certain industries which, owing to their importance to the economy as a

whole and their investment opportunities, are particularly vital. Electricity supply is likely to be one of these "strategic" industries, and any reorganisation scheme must bear this possibility in mind.

It appears certain that some at least of the functions that may be allotted to the electricity supply industry by national policy would conflict with the interests of local undertakings and that the correct timing of investment is of the greatest importance. It further seems likely that any attempt to superimpose effective controls over the existing structure of the industry might destroy the motive power of private enterprise without ensuring the desired result.

There is more than one remedy for the weaknesses of the electricity supply industry and the choice cannot, therefore, be made independently on technical grounds alone, but must be determined by wider political considerations. The most suitable organisation of electricity supply depends very largely on the functions allotted to the State in the economic life of the community, one of the most important problems awaiting solution in the post-war world. As far as this country is concerned, there appear to be roughly four major possibilities, and, taking each of these in turn as the political background, it should be possible to sketch an appropriate form of organisation for electricity supply.

Assumption 1. Should industrial and economic development be largely left to the individual efforts of private enterprise, the purpose of electricity reorganisation would be to ensure an efficient service throughout the country. A grouping of undertakings in larger units on the lines suggested in the McGowan Report would probably be necessary and adequate, if the considerable political objections to the absorption of undertakings, public or company, by their larger neighbours could be overcome.

The creation of new public boards may prove more acceptable to the interested parties, in which case regional representative boards would appear to be most satisfactory.

Assumption 2. If in pursuance of a full employment policy the State undertakes a broad planning of industrial development and control of investment, and if electricity supply is considered a "strategic industry," suitable as an instrument of public control, then reorganisation would best proceed on the lines of regional public service boards, co-ordinated and controlled by some central authority.

Assumption 3. Should regional government bodies be created

and equipped to determine and execute a regional policy, the function of electricity distribution might be transferred to them directly as a logical extension of existing municipal supply. The regional government areas might, however, prove unsuitable for the purpose of electricity supply, so that the formation of separate regional boards would be necessary. These should be representative boards with a large proportion of members appointed by the regional government bodies operating in their areas of supply.

Assumption 4. Comprehensive central planning in a Socialist society would call for a national public service board in charge of electricity supply or, possibly, of all sources of power. The delegation of a number of functions to regional executives would be essential for an efficient service to the public.

In view of the slow but steady trend towards collectivism noticeable in recent British economic history, assumption 2 is most likely to be correct for the early post-war years. The reorganisation of the electricity supply industry might then proceed on the following lines: A small number of regional distribution boards would be appointed by the Minister of Fuel and Power. Within the broad lines of policy determined by the Government, they would be free to develop their own areas, but the Central Electricity Board would provide all the necessary capital. The Central Board, reconstituted and responsible to the Government, would undertake generation and main transmission for the whole country and, at the same time, exercise financial control over the regional boards. A complete separation of wholesale and retail electricity supply would thus be avoided.

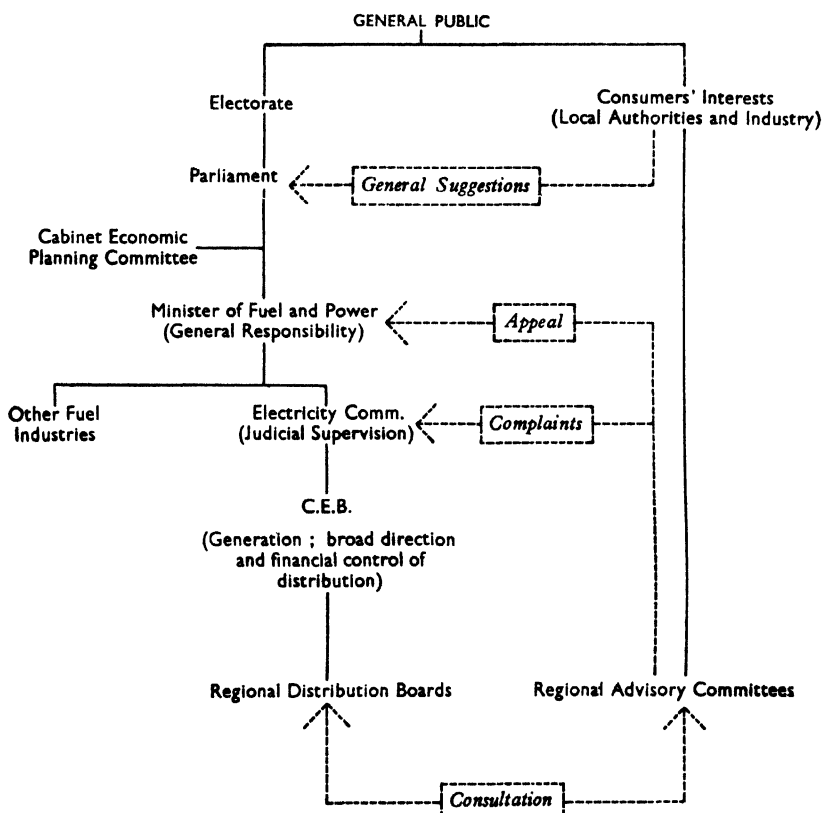
The Electricity Commissioners would become a purely technical and judicial body, supervising the industry on behalf of the Minister and adjudicating in the event of any dispute. On major issues, however, a direct appeal to the Minister by the C.E.B. or the regional boards should be possible.

Regular local contact between the distribution boards and elected advisory committees should be established, with the possibility of complaints to the Electricity Commissioners and direct appeal to the Minister.

The future structure of the industry would be roughly as shown on the following diagram.

The ultimate difficulty of reorganising the electricity distribution industry is the fact that it is no longer simply an adaptation of

PROPOSED STRUCTURE OF ELECTRICITY SUPPLY INDUSTRY



structure to changed technical conditions, but that the ends of reform are more problematical and controversial than the means to achieve them. Once the goal of reconstruction has been clearly defined, once the electricity supply industry has been set its task within the framework of the country's economic policy, then it should be possible to determine in what form the industry can best serve the community.

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INDEX

A

- Absorption of undertakings by larger neighbours, 241, 251, 252, 292-6; disadvantages, 292-6.
- Adjusted station cost, 209, 210.
- Advisory Boards, 139, 142, 144 f., 291.
- Advisory Committees, 139, 254, 256, 272, 289 f., 306, 312.
- Alternating versus direct current, 15, 20, 46, 69, 242.
- Amalgamation of undertakings, 9, 40 f., 85, 168, 242, 252, 263 f., 280, 294, 309; in London, 41, 70, 85, 90, 171, 178.
- Arbitration, 117, 199, 204, 205 f., 219.
- Area of supply, 5, 35, 39, 62, 236, 261.
- Assistance to small undertakings, 288-292.
- Assisted wiring schemes, 230 f., 235, 240, 256.
- Assoc. of Mun. Corp., proposals, 255.

B

- Backwardness of British electricity supply industry, 37 f., 155, 185, 225 f., 238 f.
- Barlow Report (Industrial Population), 267 f.
- Bedford Demonstration Scheme, 232 ff.
- Bermondsey Clause, 25, 30.
- Birchcough Report (El. Power Supply), 101, 110, 255.
- British El. Devel. Ass. (E.D.A.), 152, 262.
- Bulk supply, in London, 79, 85, 174 f.; by Municipalities, 58 ff., 67; by Power Companies, 32, 44 f., 56, 66, 70 f., 76, 214.
- Bulk tariff (*cf.* Grid Tariff), 208 f., 214; uniform, 211, 260, 281.

C

- Capital charges as cost factor, 119, 160 f., 212 f., 224.
- Central development control, 105, 107, 110, 117, 140, 264, 292, 293, 299, 302, 303.

- Central Electricity Board, 145, 175, 195, 200-223, 297; and Electricity Commissioners, 199, 200, 202-4, 213, 217 f., 278; and selected stations, 207 f.; and non-selected stations, 211-14; charges, 209 ff., 260, 271; constitution, 202; control, 208, 217-221; finance, 208, 221; functions, 195, 207, 230, 302, 304, 312; responsibility to the public, 202, 217, 220.
- Coal conservation, 96, 129, 238, 282 ff.
- Coal and Power Committee (Lloyd George), 190, 192 f.
- Collectivism, xi f., 1, 3, 22, 33, 266, 312.
- Combination of companies, *cf.* Amalgamation.
- Companies supplying over wide areas, 230.
- Competition of undertakings, 2, 9, 10, 27 f., 43, 47 f., 57, 69 f., 85.
- Compulsory powers for breaking up streets, 66, 86; of Electricity Commissioners, 187, 192, 291, 293; for standardisation, 259; over undertakers to lay mains, 10, 54, 229, 256.
- Conflict of national and local interests, 269, 272 f., 299, 311.
- Conservative Party and el. supply, 66, 81, 191, 196; in London, 77, 79, 81.
- Consultative Committees, 61, 253, 307, 308, 309.
- Consumption details of el. supply, 56, 86, 225 f., 234; and prices, 225.
- Control over supply undertakings, 104 f., 117, 292.
- Cooper Report (hydro-electric dev. in Scotland), 237, 263, 283, 309.
- Co-operation of undertakers, *cf.* Voluntary co-operation; in London, 40, 61, 84, 88.
- Cost conditions in el. supply, 27, 74, 82, 224.
- County Councils as purchasing authorities, 51; as suppliers, 62 f., 233.
- Cross Report (El. Energy), 32, 36, 44, 51, 66, 70.

D

- Demand conditions for electricity, 225.
 Democratic control of public boards, 298 ff., 305.
 Depressions, cf. Trade depressions.
 Development of unoccupied areas, 151, 176, 228 ff., 293.
 Direct current, cf. Alternating current.
 Disintegration of supply areas, 51, 150, 178, 218, 230, 251, 264 ff., 294 f.
 Distribution of electricity, 151, 224-49, 250-313; area of units, 236 f., 292; boards, 151, 296-313; capital efficiency, 226, 241; concentration of, 240 ff.; White Paper on, 1937, 182, 252 f., 285, 292, 309.
 District Electricity Boards, 101, 108-10, 117, 119-30, 140, 187, 298; and distribution, 122, 298.
 District heating, 284 f.
 Domestic supply, 36, 227, 231, 239.
 Dumfries County Scheme, 63, 233, 257.

E

- Efficiency and size, 184 f., 227, 236, 240 ff., 251, 261 ff., 292.
 Efficiency of capital in generation and distribution, 226 f.
 Electricity Commissioners, 100, 105, 116 ff., 157, 164, 185, 307; compulsory powers, 187, 192, 291, 293; formation, 105, 136; functions, 36, 105, 117, 136, 175, 187, 203, 261, 282, 291, 293, 299, 312; responsibility to public, 106, 117, 136.
 Electric Lighting Act, 1882, 9 ff., 27, 32, 77, 229, 250; of 1888, 9, 14, 27, 32, 34, 32, 79, 124, 126; of 1909, 33, 36, 65 ff., 68, 102, 120, 168, 255, 264, 265, 294, 296.
 Electricity Supply Act of 1919, 124, 136 f., 145, 176, 177, 203, 224, 229, 264, 291, 297, 298; of 1922, 145, 148 ff., 291; of 1926, 182, 199 ff., 221, 224, 245, 250, 251, 297; of 1935, 273, 271.
 Electricity Supply Bill of 1919, 116 ff., 187, 216; of 1926, 189, 195 f., 239.
 Employment effect of electrical construction, 14, 275-77.
 Employment policy, 269, 274 ff.; White Paper, 1944, 268, 274, 310.
 E.P.E.A. proposals for reorganisation, 253, 254, 307.
 Extension of supply from urban centres, 58, 237.
 Extensive development of electricity, 227 f.

F

- Fabian Society, 23.
 Farm electrification, 231, 233 f.

- Finance of regional boards, 126-30, 146 f., 149, 164, 302 f.
 Financial assistance to el. development by government, 127 f., 146, 190, 233, 270, 302.
 Financial conditions for supply, 10, 149, 235, 240, 257, 270.
 Franchise of electricity supply companies, 8 f., 13 f., 295; of tramway companies, 4.
 Frequency standardisation, cf. Standardisation.
 Fringe orders, 67, 263.
 Fuel policy, 117, 253, 282-87.
 Full employment, 274 ff.

G

- Gas and electricity co-operation, 286, 287
 Gas industry, development, 2, 4.
 Generating plant, concentration of, 55, 37, 184, 207, 223; in London, 72 ff., 159 ff., 166, 173; costs, 82, 119, 128 f., 150, 160; importance of size, 35, 37, 71, 99, 100, 103 f., 129, 160, 185; siting, 44, 72, 119, 129, 160.
 Generation, regional or national organisation? 99-104, 110, 118 f., 186, 188, 255.
 Grid, 205, 207, 231; charges, 208; construction, 205; economics, 207 f.; schemes, 205, 276; tariff, 208-11, 213, 260, 280.
 Guarantees to supply undertakers, cf. Financial conditions for supply.

H

- Haldane Committee (Coal Conservation), 98, 100, 119, 255, 282.
 Hire and hire-purchase of el. appliances by undertakers, 68, 137, 230, 235, 240, 256.
 Holding companies, 41, 93, 238, 262, 272.
 Hydro-electric Board for Northern Scotland, 263, 283.
 Hypothetical cost charge to selected stations, 209 f.

I

- I.M.E.A. proposals for reorganisation, 222, 255, 256, 265, 294.
 Incorporated Ass. of El. Power Cos., proposals, 254, 294.
 Intensive development of electricity, 226 f.
 Interconnection of stations, 87 f., 90, 97, 102-4, 207, 162, 166, 185 ff., 189; of distribution networks, 242.
 International trade and el. supply, 98, 190.
 Investment control in el. supply, 278.

J

- Joint Boards, 60, 91, 106, 108, 168, 253, 265, 294, 296.
 Joint Committees, 85 f., 168; as purchasing authorities, cf. Purchase rights.
 Joint Committee of el. supply organisations, proposals, 254, 256, 259, 260, 262, 263, 271, 289, 295.
 Joint Electricity Authorities (cf. also London and Home Counties J.E.A.), 131-41, 145, 188, 264, 297, 298, 303; distribution powers, 137, 216, 230, 298; finance, 135, 146 f., 149, 164, 167; functions under the 1919 Act, 136 f.; functions under the 1926 Act, 215, 230; schemes, 139, 154 f., 216; weakness, 133 f., 137.

K

- Kirkcudbright County scheme, 63, 233 ff.
 Kitson Clause, 47 f., 78, 82.

L

- Labour Party and el. supply, 83, 149, 171 f., 188, 190 f., 198; reorganisation proposals, 253, 306 f.
 Lack of effort by undertakers, 31, 37, 185, 228, 239.
 Legislation as factor in el. development, 38, 39, 54, 65, 153, 185.
 Liberal Party and el. supply, 66, 78, 81.
 Licence for electricity supply, 10.
 Lighting load as basis of economical supply, 37, 55, 57.
 Linking-up, cf. Interconnection.
 Load factor, 36, 37, 225, 237, 244.
 Local Authorities, as electricity undertakers, 25-27, 88; enterprise, 31, 33, 39, 58, 70, 161; obstruction, 31 f., 49 f., 172; power of veto, 13, 32 f., 44, 47, 67, 301.
 Local Government Act, 1888, 17, 23, 62; reform, 275, 288 f., 303.
 Location of industries, 71, 115, 158, 268.
 London and Home Counties J.E.A., 155-183, 293; and C.H.B., 175, 176, 183, 214; constitution, 162 f., 173; as distribution authority, 176, 182, 306; functions, 163 f., 169, 171, 173 f., 175 f.; reorganisation proposals, 254, 302.
 London County Council, formation, 16 ff.; reorganisation schemes, 1902-7, 39, 77-84; reorganisation schemes, 1914-15, 64, 91-93, 156, 297; proposed acquisition of local authorities' undertakings, 82, 85.
 London el. supply, 18-20, 69-94, 153-183; Acts of 1908-10, 40, 41, 51, 61,

86, 156; of 1925, 41, 173, 248, 294.
 London Passenger Transport Board, 304.

M

- Marindin Report (London supply), 19 f., 46, 69.
 Maximum prices, 10, 247, 261.
 McGowan Report (El. Distribution), 42, 134, 178, 182, 227, 237, 240, 241, 246, 257, 252, 257, 259, 260, 265, 272, 280, 289, 292, 293, 295, 296, 298, 309, 310.
 Merz Committee, cf. Haldane Committee.
 Merz Report (London supply), 1914, 72 ff., 90.
 Methods of charge, 245 f., 259 f., 300.
 Metropolitan Water Board, 64.
 Minister of Fuel and Power, xv, 287.
 Minister of Transport, xv, 117, 156.
 Mixed undertakings, 63-65, 84 f., 91-93, 108, 143, 200, 297.
 Monopolistic tendencies in electricity supply, alleged, 22, 49 f., 76, 191.
 Municipal trading, 3, 15, 22-33, 59 f., 88 f., 294, 298 f.

N

- National bulk tariff, 211, 280; electricity distribution board, 306-8; electricity generation board, 222 f., 253, 306 f.; fuel policy, 253, 282-87; fuel advisory council, 287; planning policy, 266-87, 296, 306; reorganisation of electricity, 101, 111, 306 ff.
 Nationalisation of el. supply, 51, 101, 110 f., 118, 188 f., 253.
 North of Scotland Hydro-electric Board, 205, 283.
 Norwich Demonstration Scheme, 232 ff.

O

- Obligation of undertaker to develop supply, 10, 51 f., 54, 256 f.
 "Organised co-operation," 254, 256, 263, 289, 310.
 Overhead transmission, 35, 235, 236.

P

- Parliamentary control of public boards, 220 f., 297, 300, 304 ff., 312.
 Parsons Report (El. Trades), 100.
 P.E.P. Report (El. Supply), 251, 262.
 Permissive legislation, 86, 87, 107, 120, 156, 172.
 Pithead generation, 44, 119.
 Power and lighting load, 36, 45 ff., 55, 71, 93, 159, 238.
 Power companies, 42-57, 66, 214, 228; Acts, 44; bulk supply, 32, 44 f., 56, 66, 70 f., 76, 214; early disappointments, 45, 49, 54 f.; permanent

- concessions, 44, 50 ff., 67, 79, 294 ; power supply, 45 ff. ; proposals for London, 56, 75-79 ; restricted powers, 45, 47, 48 f., 54 ; for reorganisation of el. industry, 68, 142.
- Price control, 10, 53 f., 247 ff., 261.
- Profits by municipalities ?, 27 ff., 59, 248.
- Progress of electricity supply, 184, 228 f., 238.
- Provisional orders for el. supply, 10, 11 ; unused, 31.
- Public and company undertakings, antagonism, 22-33, 39, 49, 68, 140, 143, 185, 264, 294, 298.
- Public ownership of el. supply, reasons for, 7, 22-31, 58 f., 295, 297.
- Public Corporation, Public Service Board, 111, 193, 200, 217, 274, 283, 297, 303-10, 311 ; constitution, 304, 305, 308 ; control, 217-21, 304 f. ; weakness, 306, 308.
- Public Works Facilities Act, 1930, 277.
- Purchase rights of local authorities, 41, 50 ff., 150, 230, 265, 294 ; in London, 41, 51, 76, 79, 85, 86, 171, 176 f. ; exercised by joint boards or committees, 51, 52, 67, 230, 265 ; not extending to power companies, 44, 51, 67, 79, 294 ; removal suggested, 254, 290 ; suspended, 150, 151, 265 ; transfer to J.E.As., 152, 176 f., 230 ; transfer to new public bodies, 51, 122, 265, 295 f.
- Purchase terms under 1888 Act, 14, 124 ; under 1919 Bill, 122-26 ; under London Acts, 1925, 179.

R

- Reconstruction after World War I, 113 ff.
- Regional boards (cf. also District boards, Joint Electricity Authorities and representative boards), for generation, 107-10, 120-30, 131-34, 215 ; disadvantages, 110 f., 120 f. ; for distribution, 216, 238, 297, 298-303, 308-10, 311 ; finance, 126-30, 146 f., 149, 164, 302.
- Regional government, 50, 273, 288 f., 301, 309, 311 f.
- Regional interconnection, 102 ff., 106 ff.
- Regional schemes under 1919 Act, 139.
- Relief of rates from municipal trading, 28 f.
- Reorganisation proposals for el. distribution, 151, 251-313.
- Representative boards, 64, 91, 107-10, 120 f., 201, 215, 297, 298-303, 311 ;

- constitution, 109, 120, 298 ; dangers, 121, 132 f., 201, 299, 301, 303.
- Restriction of supply after World War I, 115, 129.
- Revision of maximum prices, 82, 152.
- Rural electrification, 30, 190, 231-38, 269, 278, 301 ; development schemes, 232 ff. ; progress, 231 f. ; problems, 31, 235, 258 ; from urban centres, 58 f., 237, 242, 264, 273, 296.

S

- Sale of fittings by local authorities, 137, 230.
- Scott Report (Land Utilisation), 235, 268 f., 278.
- Selected stations, 195, 205, 207 f., 210.
- Size of undertaking, and consumption, 226, 240 ; and efficiency, 184 f., 227, 236, 240 ff., 251, 261 ff., 292.
- Sliding scale of prices and dividends, 3, 13, 53 f., 83, 180 f., 248 f., 261, 280.
- South-East England Scheme (C.E.B.), 175, 205.
- Speculation in supply companies, 6, 11.
- Standardisation, 137, 291 ; of equipment, 15 ; frequencies, 189, 199, 206, 219, 291 ; systems, 118, 137, 240, 242 f., 258 f., 300 ; voltages, 137, 242 f., 258 f., 291, 300, 301.
- Subsidies for el. development, 30, 142, 238, 258, 262, 270 f., 280, 291, 293, 296, 301.
- Suspension of purchase rights during World War II, 265.

T

- Tariffs, 243-47 ; block, 247 ; domestic, 245 ; equal for whole country, 260, 278-82, 300 ; flat rate, 152, 244 f., 260 ; two-part, 244 f., 260 ; uniform methods, 245 f., 259 f., 300.
- Technical progress in el. supply, 34, 185 f.
- Tennessee Valley Authority, 304.
- Tidal power, 119, 283 f.
- Town planning, 30, 59 f., 115, 159, 269 f., 273.
- Trade cycle and el. development, 129 f., 160, 275.
- Trade depressions, 267 ; of 1882, 11 ; of 1900-3, 55 ; of 1920, 115, 139 f., 161 ; of 1929-33, 227, 258, 276.
- Trades Facilities Acts, 146, 190, 275.
- Transmission of electricity, 5, 35, 186 ; board, 193 f.

U

- Unemployment, 274, 310; grants committee, 146, 190, 232, 233, 275, 277; relief by electricity development, 14, 146, 190, 199, 275 ff.
 Uniform methods of charge, 245 f., 259 f., 300; rates, 260, 279-82, 300.
 Utilisation of coal, 284.

V

- Voluntary co-operation, 87, 94, 101, 106, 112, 131, 139 f., 153, 156, 183, 184, 256, 264, 291: of companies, 40, 94,

264; of local authorities, 60 f., 108, 294; of municipalities and companies, 77, 84 f.; schemes for J.E.A., 131-34, 136, 138.

W

- Water power, 282 ff.
 Weir Report (El. Supply), 186, 188, 194 f., 202, 210, 214, 215, 219, 230, 239.
 Williamson Report (El. Power Supply), 100, 105, 106, 108, 109, 110, 112, 118, 126, 140, 156, 186, 187, 255.
 Wiring by municipalities, 68.

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